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THE CATSKILL MOUNTAINS.

BY

PROF. ANGELO HEILPRIN.

The traveller who approaches the Catskill Mountains from the side of the Hudson River, which is the more general side of approach, sees outlined against the western horizon a series of elevations which are not particularly distinguished for loftiness or for dominating peaks or summits, or for that which makes ruggedness in scenery. They loom up to about the general height of the Highlands of Scotland, of the Harz Mountains of Germany, or of what was for a long time thought to be the culminating point of the State of Virginia, the Peaks of Otter. Although occupying one of the many regions of the United States which are fancifully designated "Switzerland of America," they have no features which are truthfully Alpine in character. There are no overshadowing peaks, no patches of snow to make glaciers, no bodies of water that have a mountain setting. The Catskills, barring some rugged precipices on their outer face, and a number of deeply-worn ravines or gorges, the so-called "cloves," present, in general, scenery of that subdued type which the geologist likes to associate—but not always accurately—with an ancient land-surface, in which the scenery has been shaping itself for almost untold ages. There are no great *aiguilles* or *Hörner,* none of those rugged serrations which the geologist, and again not always truthfully, prefers to recognize as types of a new country and of a newly-formed landscape. The Catskills, although less old than many of the mountainous parts of Norway, are yet much more subdued or gentle in outline than the Scandinavian Alps; although more ancient than the coal-bearing section of the Appalachian Mountains, they are more rugged in contour than these.

The geologist recognizes in them the remains of an ancient plateau, whose top-line is still well indicated in the nearly equivalent points of elevation to which the dominant summits rise, and out of this plateau have been carved out by water and atmospheric agencies those individualized elevations to which the names of "mountain," "mount," or "peak" have been given.

The association of elevations to which the name of Catskills (or, in the original Dutch, Katzbergen; the Indian *Onti Ora,* "Mountains of the Sky") has been given, lie in their main part in Greene and Ulster Counties, in the State of New York, with minor but not unimportant ramifications or projections, sometimes known under the names of Western Catskills and Delaware Mountains, extending westward into Delaware County. They cover an area of approximately five hundred square miles, or somewhat less than one and a half times that which is embraced within the municipal City of New York. On their eastern face they approach to within about eight miles of the Hudson River, when they descend abruptly, from a height of some 2,000-3,000 feet, into the basal plain below. Palenville, which is located at the east foot of the mountains, at the entrance to the Kaaterskill Clove, occupies a position 470 feet above the sea; back of it, in a straight distance of five and three-quarters miles, lies the village of Tannersville, at an elevation of nearly 1,900 feet above sea-level. At one point, where the crest of the plateau forms a ridge of South or Pine Orchard Mountain, marking the site of one of the oldest summer-frequented hostelries of the Unitel States, the Catskill Mountain House, the plunge of the plateau forms a sheer cliff escarpment—a beetling crag, whose summit commands a view of surpassing grandeur, which by its atmosphere and distance can easily claim to be one of the most inspiring views of the national domain east of the Rocky Mountains. It was from the crest of this ledge, at an altitude of 2,225 feet, that Leatherstocking obtained what he laconically termed a "view of all creation."

The culminating point of the entire Catskill system is Slide Mountain, seven miles SW. of Phœnicia, and 30 miles SW. of the village of Catskill, which attains a height of 4,204 feet, or almost exactly 200 feet less than the highest point of all Britain, Ben Nevis. While thus more dignified than modest in elevation, the mountain still falls short of nearly all the better-known summits of the Adirondacks and lacks somewhat over 1,100 feet of the culminating point of the State (Mount Tahawas or Marcy). The second summit in elevation is seemingly Hunter Mountain, about three miles from Tannersville, which rises to 4,025 feet. Other noted points are Black Dome

(3,990 ft.) and Black Head (3,937 ft.), a few miles SW. of Cairo; High Peak (3,660 ft.) and Round Top (3,470 ft.), in the eastern section, almost directly W. of Palenville; Indian Head (3,585 ft.), and Overlook Mountain (3,150 ft.), near the southeastern angle; Peak-o'-Moose or Peekamoose (3,863 ft.), in the extreme south and three miles S. of Slide Mountain; Panther Mountain (3,760 ft.), four miles N. of Slide Mountain; and Big Indian (3,721 ft.), eight miles SW. of Shandaken and the adjacent Doubletop Mountain (3,905 ft.). The heights of other summits will be found on the map in this BULLETIN. Most of these mountains are, or were until recently, well wooded quite up to their summits, and the forest primeval was represented by magnificent specimens of the pine, spruce, liriodendron, oak, ash, hickory, beech, and maple. The rhododendron and mountain-laurel, with their superb blossoms of rose and white, still form here and there illumining patches of undergrowth, and recall in a minor way the glories of the chaparral bush of the Black Mountains of North Carolina.

The main region of the Catskill Mountains is drained primarily by Esopus and Kaaterskill Creeks and the Schoharie and Delaware Rivers, and their tributaries, the first two draining eastward directly into the Hudson, and the Schoharie northward into the Mohawk. The East Branch of the Delaware River rises in the western portion of the mountain knot, near the hamlet of Fleischmanns. There is reason to believe that at a not late period—the Post-Glacial of geologists—the Schoharie discharged directly eastward into the Hudson instead of, as it now does, into the Mohawk, a tilting of the land-surface northward being, as some geologists view the condition, responsible for this change of flow. What is assumed to be the ancient course of the river is marked out by a tortuous line of gravel and clays, which can be traced with sufficient continuity over a considerable extent of country. Other deserted river-beds are found in different parts of the region, and some of these also point to uplifting as a cause for the abandonment of a channel already formed. An element of charming quality in the landscape of the Catskill Mountains is furnished by the deeply-incised water-ways, gorges, or "cloves," of the streams, mostly tributary to the main water-courses. Such are the cloves (South African Dutch *Kloof*) of the Kaaterskill, opening out into the basal plain at the eastern foot of the mountains at Palenville; the Plattekill, descending from near Tannersville to West Saugerties; the Stony Clove, connecting the plateau near Tannersville with the valley of the Esopus at Phœnicia; and the Deep Notch, between Lexington and Shandaken. The streams

flowing through these deep and rugged ravines are mostly mountain torrents of tempestuous courses, heavily laden with boulders, and some of them, like the Kaaterskill, heading up into true rock amphitheatres or *cirques*. The foaming streams that tumble from the crest of the plateau over the back walls of these amphitheatres are a striking and even imposing feature in the landscape of the Catskills, unfortunately too frequently marred by that narrowing of detail which results from a deficiency of water-supply. The most notable of the waterfalls of the region are those which occur in the main course of the Kaaterskill and the major leaps which terminate the forking cloves near its head—the Kaaterskill Falls, with a vertical descent in two sections (upper and lower) of 180 feet and 80 feet, and the Haines Falls, dropping about 155 feet and 80 feet. The Devassego Falls of the Schoharie are also strikingly picturesque. The cloves, with their rapidly pitching walls, are a recent product in the making of the Catskills, having been fashioned in greater part, if not entirely, since the close of the Great Ice Age or Glacial Period. This may have been many thousands of years ago, but the narrowness of the clefts and the steeply-pitched slopes bear testimony to comparative youth in existence—a life-period not sufficiently extended to have worn down the bounding walls into gently-flowing contours or to broaden out the narrow floors into openly-swelling valleys. Geologists speak of these ravines as V-shaped in cross-section, distinguishing them from the U-shaped form that marks the typical valley of old age or maturity.

A marked negative feature of the Catskill region is the absence of lakes, this structural feature, so largely developed in the Adirondacks, being virtually limited to the two tarns that lie near the eastern crest of the mountains as the head-waters of one of the arms of the Kaaterskill and bear the designations of North Lake and South Lake. They are mere shallow pans of water, lying a short distance from the foot of North Mountain, which in their expanse follow closely the vicissitudes of dry and wet weather.

The traveller who, hardly more than twenty-five or thirty years ago, visited the Catskill region need not have been surprised in his wanderings to come across the trail of some of the more formidable animals which in less accessible regions still constitute part of the fauna of the North Woods. The writer of this article has heard the cry of the American lion or panther (catamount) not far off the beaten path near the head of the Kaaterskill Clove, and he has come face to face with the bear on the open stage-road leading to the Mountain House. To-day these and other animals, such as the lynx

("wild cat"), badger, deer, and fox, have either been driven completely out of the country or pressed into the inner recesses before the steadily advancing tide of visitors and resident cottagers. But the region carries the impress of its fauna in the names that still cling to some of its more salient features, such as Panther Mountain, Panther Gorge, Bear Lodge, Mink Hollow, and Moose Mountain.

In their structural relations as part of the great Appalachian uplift—the expression of those series of disturbances in the earth's crust which resulted in the making of the parallel lines of mountains of the eastern United States which under different names (Alleghany Mountains, Blue Mountains, Kittatinny Mountains, Shawangunks, North Mountain, Shenandoah Mountains) make up the bulk of what is known as the Appalachian system—the Catskills recite a comparatively simple history. Long ages ago, at a time when hardly a reptile crawled upon the earth's surface, when the type of the common bony fish was entirely or all but undeveloped, when no bird winged its way through the atmosphere and thrilled the world with song, when long ages had still to come and to go before the earth was to know a quadruped, the sediments—muds, sands, pebbles—which were ultimately to make the Catskill rocks were accumulating; they were being laid down in an arm of a vast sea that extended westward through the interior of what is to-day the United States. These sediments were at a somewhat later time, when the mountain-making ("orogenic") movements were elevating the land out of the sea and by compression forcing up blocks of the crust into great swells or ridges, compacted into solid rock; and it is to this series of rocks, cropping out on the roadside, usually reddish, greenish or bluish in colour, forming the sandstone and shaly mass of the amphitheatres in the cloves, and giving much of the paving-slabs that in our eastern cities are known as "bluestones," that the name of Catskill Formation has been applied by geologists. It constitutes part of the upper (or newer) section of the great Devonian System, and corresponds, partially at least, in formation and time of formation with those Old Red Sandstones of the Scottish Highlands whose history has been so lovingly written by one of the earliest of systematic geologists, Hugh Miller. Here and there, if we examine the rocks closely, we may discover within it traces of the animal life which existed at the time that the rocks were being made. These traces may be in one place the shells of clams or sea-snails, at another place of different shrimp-like animals; or they may be the fragments of a giant representative (*Stylonurus*) of the modern king-crabs, or, again, the scales or parts of the dermal armour, or even the teeth

and jaws of a class of mailed or heavily-bucklered fishes (*Coccosteus, Bothriolepis, Holoptychius*) which are still generally known under the collective name of ganoids, and of which the sturgeon and the gar-pike have been thought to be lingering modern representatives. In some quarry, perhaps, where the quarrymen are lifting off slab from slab, we may note that the surfaces of the rock are crossed by wave-like ridges, half-an-inch or an inch across; these, the geologist tells us, are ancient "ripple"—ripple-marks, the same as are made to-day, impressed upon the ancient sands, and retained through millions of years. The rock-surfaces may also show "sun-cracks," and at rarer intervals we note those numerously scattered pits, "rain-drop impressions," which so eloquently read the lesson of ancient meteorology.

The rocks of the Catskill region did not partake of that general crumpling and folding which marked the elevation of the main ridges of the Appalachians. The region was lifted up without any great disturbing movements to impress themselves upon the newly forming land-surface; and hence it is that in nearly all parts where the rock-beds are exposed to view they appear to lie in nearly horizontal lines ("horizontal bedding") or in lines that fall ("dip") gently toward the interior. It is bound in with this condition, likewise, that the region, like its correspondents, the Pocono, Alleghany, and Cumberland plateaus farther south, retains a plateau character instead of one of rapidly alternating ridges and included longitudinal valleys, or of an aggregation of irregularly-sorted mountain buttresses. Overlying the shales, flags, and sandstones which build up the great bulk of the mountains, and appearing here and there as a capping to their higher points, is a series of rough pebbly rocks which belong to a system seemingly somewhat newer in date than the Devonian—namely, the Sub-Carboniferous. They are known to the systematists as the Pocono Sandstone or Conglomerate, and are the local "pudding-stones" of the everyday field observer. We recognize in them merely an ancient shingle, or "shingle-beach," in which the individual pebbles have been firmly united or cemented together. It is this rock which bounds some of the narrow passages that in the region have been facetiously termed "lemon squeezers."

The casual visitor to the Catskills, be he geologist or not, can hardly fail to notice that in some places the exposed rock-masses have been worn down to singularly smooth surfaces, and that in these or other parts their surfaces are grooved with parallel lines or furrows, most of them perhaps not thicker or wider than a slate-pencil, but others swelling out into broad flutings. One finds the

same kind of smoothened or polished surfaces, of impressed lines ("striæ") and grooves, in almost every country that is to-day traversed by glaciers; and it is, perhaps, not remarkable that the far sight of Louis Agassiz, an ardent student of the Alps, should have so easily detected in them the features of ice-worn Switzerland. It is to him, primarily, that the geologist owes the recognition of an Ice Age or Glacial Period, in the Western Hemisphere, when great tongues of ice—giant glaciers—moved over a large part of the northern United States east of the Mississippi Valley, and in a minor way westward of it, burying the landscape beneath a mantle of a long-protracted winter, and heaping up the ice, o'er mountain and valley, to thicknesses of hundreds and thousands of feet. At whatever time-period these Arctic conditions may have prevailed over what is to-day temperate America—whether, as some geologists would lead us to believe, it was only 10,000-20,000 years ago, or, again, as others think, 35,000-50,000 years, or more—it is certain that at that time the Catskills were buried to their brim with ice, and that there were few if any spots to protrude through the great capping of glaciers that rode over their summits. The general direction of movement of the glaciers was southward or southwestward, as the "spring" points in the striæ plainly indicate, and as the numerous travelled blocks of stone, the glacial boulders or "erratics," with characters impressed upon them to show that their mother rock lay in a more or less distant land northward, just as clearly prove. These erratics are scattered about on mountain-top and in the valley, strangers among the rock-masses in whose keeping they are now placed. Many of them are fossiliferous, and contain an aggregation of fossils that are not to be found in the rock *in place* of the region.

No description of the Catskill region would be complete without a passing reference to some of the points of view which have become noted for the magnificence of the panoramas which they command, such as the Pine Orchard ledge of which mention has already been made, whence the eye sweeps over into the mountain country of Massachusetts, Vermont, and New Hampshire; the Kaaterskill Knob (2,500 ft.), North Mountain (3,440 ft.), North Mountain Outlook (3,100 ft.), Sunset Rock (2,115 ft.), Prospect Rock, Palenville Overlook (1,660 ft.), Overlook Mountain, Slide Mountain, and Pine Hill Summit (2,500 ft.), the last-named on the watershed between the Hudson and Delaware rivers. The association of the mountains with American legendary lore is revealed in the personality of Rip Van Winkle, the scene of whose chief adventure is laid in Sleepy Hollow, on the lower eastern slope of North Mountain.

THE MAP OF THE CATSKILLS.

The readers of the BULLETIN will find in this issue a map of the Catskill Mountains and the adjacent parts of the Hudson River valley. The map is an excellent specimen of cartographic art, which would not have been possible to make if the topographic sheets of the United States Geological Survey, covering the entire region of the Catskills, had not been completed. The map is grounded upon these sheets, and it has, therefore, a scientific basis.

This fact, however, would not be sufficient to make the map a scientific product. That end could be gained only by having the map produced by cartographers of the highest attainment, able to interpret the information on the base sheets and reproduce it on the smaller map without the sacrifice of essential facts. These results have been secured in this accurate and artistic map of the Catskills.

Maps giving an equally correct idea of parts of the earth can be made at this time of only a comparatively small area, because detailed surveys, as yet, cover only a small part of the world. Such superior maps may be made of nearly the whole of Europe, of about a third of our own country, and a few other important areas. All good maps may give an excellent idea of the shape, size, and position of the land masses, because the maritime nations send their warships and other vessels to make scientific surveys of nearly every coast and to keep their charts up to date.

The second basis of the best atlas maps is the topographical surveys which are constantly being extended. But maps of the larger part of the land surfaces still depend upon vast accumulations of data relating to the position and elevation of places and areas, the direction and length of highways and routes, etc., and the critical expertness of the geographer in selecting from the mass of material that which is most worthy to be reproduced.

The American Geographical Society had an educational purpose in view in producing the Catskill map. It desired to show what truthful and admirable maps may be made of our own country, so far as the Government topographic surveys supply the material. These surveys have been completed in several of our States, and are far advanced in many parts of the country, so that we may hope the day is not far distant when first-rate maps of large parts of the United States will be found in our atlases. Our deficiency in good atlas maps of our own domain is often commented upon at home

and abroad. Attention was called, for example, in the "Literaturbericht" of *Petermanns Mitteilungen,* for January, to the great progress our topographic surveys have made, and the writer said it could scarcely be believed that the importance of making a good map of the United States, based upon these surveys, would not soon appeal to so practical and highly developed a people as the American.

This map is an example of first-rate cartographic work. It gives intelligent expression to the geographical truth about the Catskill plateau and the neighbouring plain. These facts might be given in more detail on a larger scale, but the purpose was to produce an accurate map sheet adapted for an ordinary folio atlas, convenient to handle and suited for carrying in the pocket.

The reader familiar with any part of the Catskills will find much to interest him in this map. He will see the brooks as well as the rivers; the common roads and the trails, as well as the railroads. If the house in which he spent his vacation weeks is outside of the crowded village, he will probably see it indicated. If he has ever followed a short private road leading to an isolated house, he will see both the road and the dot where the house stands. He will observe the level stretch of the valleys, the forms of the mountain ranges, and the heights of the conspicuous summits; and this small sheet will convince him that a high-class map is a short cut to a great variety of information—a book of description and explanation condensed by cartographic methods to a small compass.

To produce the map the Society engaged the services of Wagner & Debes of Leipzig, one of the leading cartographic houses of the world. The thanks of the Society are extended to this firm for the great care and efficiency with which they carried out the commission. The work was not done at home, simply for the reason that so adequate a result in the way of generalization of the superior cartographic material supplied by the Government topographic survey cannot at present be procured in our country. We may hope that the lack of so important a facility will be remedied in the near future.

Copies of the map, folded for the pocket, may be obtained at the Office of the American Geographical Society for twenty-five cents a copy.

TYPICAL EARLY MAPS OF THE NEW WORLD.

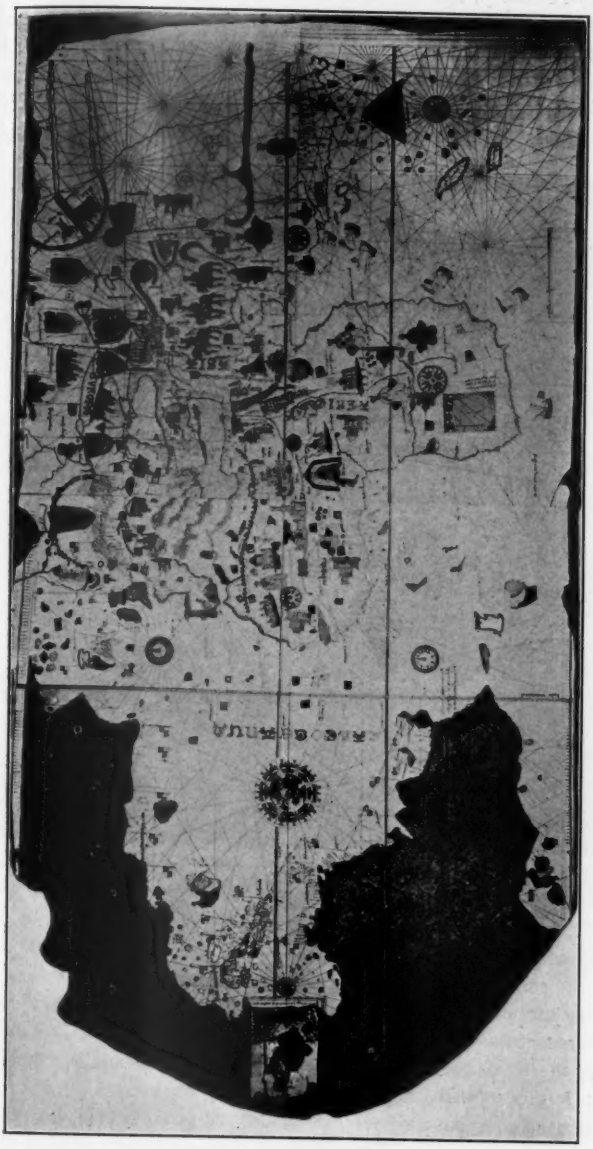
BY

E. L. STEVENSON.

Many schemes may be devised for a classification of the early maps of the New World, any one of which may be made to serve a useful purpose in their study and exposition.

In this paper it is proposed to present a classification which is based upon the more general features of the maps rather than one in which the chronological element is fundamental, or the development of any special coast areas in particular enters. The original maps, the coast sketches made by pilots, captains, and professional draughtsmen who accompanied early expeditions to the New World, with scarcely an exception, have been lost or destroyed. The typical maps, therefore, as all maps, are derivatives, not originals in the sense to which I have just alluded, into the composition of which many coast sketches, many descriptive records, have entered. Kohl has observed that with no class of historical documents has time been more destructive than with old maps. The many that have come down to us are but a remnant of the many which were constructed in those early years—a fact to which numerous references in the literature of the period bear witness. In these survivals, however, there are certain types, a careful study of which is instructive and interesting.

Very naturally, one would expect to find greatest activity in the charting of the new coasts in those countries most directly interested in maritime exploration, and among the productions of these countries to find the maps of greatest importance draughted during the period of discovery. Yet in this connection the following facts are worthy of note: The Juan de la Cosa map is the only important one known, draughted in Spain, during the first thirty years after Columbus opened the way to the new regions of the west; the Portuguese influence during the same period is most strikingly pronounced in the maps extant which lay down the new coasts; although the native Italians were the most prominent explorers and map-makers who served the kings of Spain and of Portugal, the Italian cartographers at home exhibited a tardy interest in adding these new coasts to their world maps, but after the middle of the century their work came to be of first importance; the Germans, though occupying



JUAN DE LA COSA.

an inland country, through their interest in the new scientific studies, particularly geography and mathematics, exerted an influence upon the cartography of the New World during the early decades of the sixteenth century unsurpassed by any other country of Europe; French cartography of the New World is of late origin, exhibiting from the first both Spanish and Portuguese influence, while the im-

MUNICH-PORTUGUESE (1502?)

portant cartographical documents of the Low Countries and of England belong to the late sixteenth century.

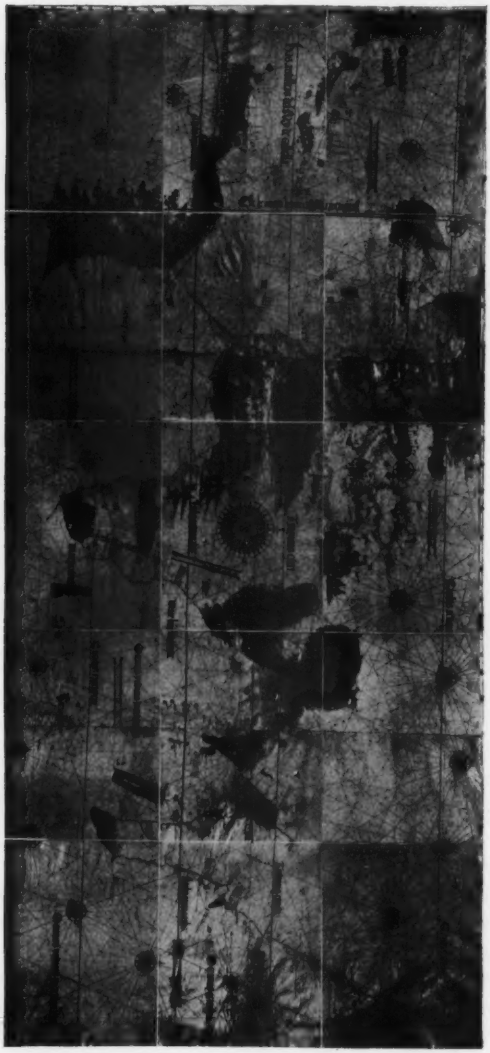
In the scheme of classification here presented it may be a question whether the work of Columbus' companion, Juan de la Cosa, should be referred to as representing a type of early New World maps. It at least merits a word by reason of the important position it holds. It is clearly a compiled map, and a number of the elements of which it is composed may have entered into other early maps. If, however, it exerted an influence on contemporary or subsequent cartographical

work, that influence is difficult to trace, although in one or two of its special features, as in the peculiar contour of Cuba, it appears to have a companion in the Oliveriana. The proposition that it reproduces actual coast surveys which were made along the Atlantic seaboard, however hasty and general in character they may have been, is not to be dismissed merely because unsupported by contemporaneous written accounts.

It is reasonable to assume that the earliest general maps of western discoveries represented the new regions as a group of islands. It was the belief of Columbus that he had "found many islands." Maps, therefore, of the New World in which the insular character of the land discovered is made prominent, constitute what I shall call the first type. These maps are not numerous; nor are those of the type which have come down to us the oldest-known New World maps. They do not give indication that they are copies of a common original, although they are pronouncedly Portuguese. By reason of certain peculiarities, they may well be divided into two groups, to the first of which belong the Hamy and the Munich-Portuguese charts of about the same date, which is before 1503. They are maps *in plano*. To the second group belong the Lenox Globe, the Winsor or Da Vinci gores, the Jagellonicus Globe, and, lastly, the unique but small and unimportant map produced in Venice in the year 1528 by Pietro Coppo. The second group, with the exception of the last named, may be called globe maps. In very nearly all of the maps of the first quarter of the sixteenth century Cuba is made to lie too far to northward. In our first group, as above mentioned, it has this incorrect position, with a very decided trend to northwest, extending from about the thirtieth to about the fiftieth parallel of north latitude. The Cortereal discoveries are recorded, and as much of the South American coast as had been explored by the Portuguese navigators.

The three globe-maps of the second group appear to attach but little importance to the Spanish Antilles, laying down only a few of those islands. They give but slight intimation of a knowledge that a continental region lies to the northwest of those islands, although South America is given with an area almost continental, having a well-defined circumscribed coast-line.

The two charts preserved in Munich and believed to have been the work of Pedro Reinal and of Pilestrina may be taken as conspicuous examples of the second type of Portuguese work. Spanish discoveries do not receive recognition—a fact, however, not to be considered as indicating a want of knowledge of such discoveries, but rather a purpose to emphasize the claims of the Portuguese to lands



CANTINO.

in the west. Early maps of the New World of this special character, that is so exclusively national, are not numerous, as the great majority, in their general features, give a record more nearly complete of the knowledge possessed to date.

Before the discovery of America the Portuguese held the leadership among nations interested in maritime exploration, and the fame of their enterprises was matter of common report throughout Europe. This fact, in part at least, accounts for the great popularity of early Portuguese charts of the western lands and the apparently greater influence of early Portuguese cartography. It is probable that the Portuguese Government pursued a more liberal policy with regard to the spread of information concerning western discoveries than did the Government of Spain. A jealousy of recent Spanish successes might easily have prompted such a course.

It was the Cortereal discoveries to the north of the Spanish claims, and the Cabral discoveries to the south, which especially stimulated Portuguese ambition for possession in the west at the opening of the sixteenth century and encouraged the construction of new maps which were to contain the latest information. Duke Hercules' instruction to Cantino, his Envoy at the Court of King Emanuel, assures us of this fact. A third type of early maps appears to have had its origin about this time, which type proved to be one of the most influential and interesting. Two very early examples of this type have come down to us, both of which have but recently become known, the first being the work of Duke Hercules' Envoy, and the second the work of Nicolo de Canerio Januensis, as he refers to himself on his map. These maps give prominence to the land supposed to have been visited by the Cortereals and, very conspicuously, the continental regions lying to the north and the south of the Spanish Antilles. The west or Pacific coast-line of the new lands is altogether omitted. In the maps of this type the two continental areas are represented as separated by a body of water, indicating either a belief in the existence of a strait leading from Oceanus Occidentalis into Oceanus Orientalis, or a belief that that particular region was one which had not yet been explored. There is little justification for the statement that these maps give evidence of a belief in an Asiatic connection of the new lands; the nomenclature does not support such a theory. They suggest the possession of knowledge gained directly from coast charts and from written accounts, but information which in part may have been taken from clandestine voyagers. Whatever the sources, here is certainly record of discoveries actually made and reported along the Atlantic coast before Ponce de Leon, or Ayllon,

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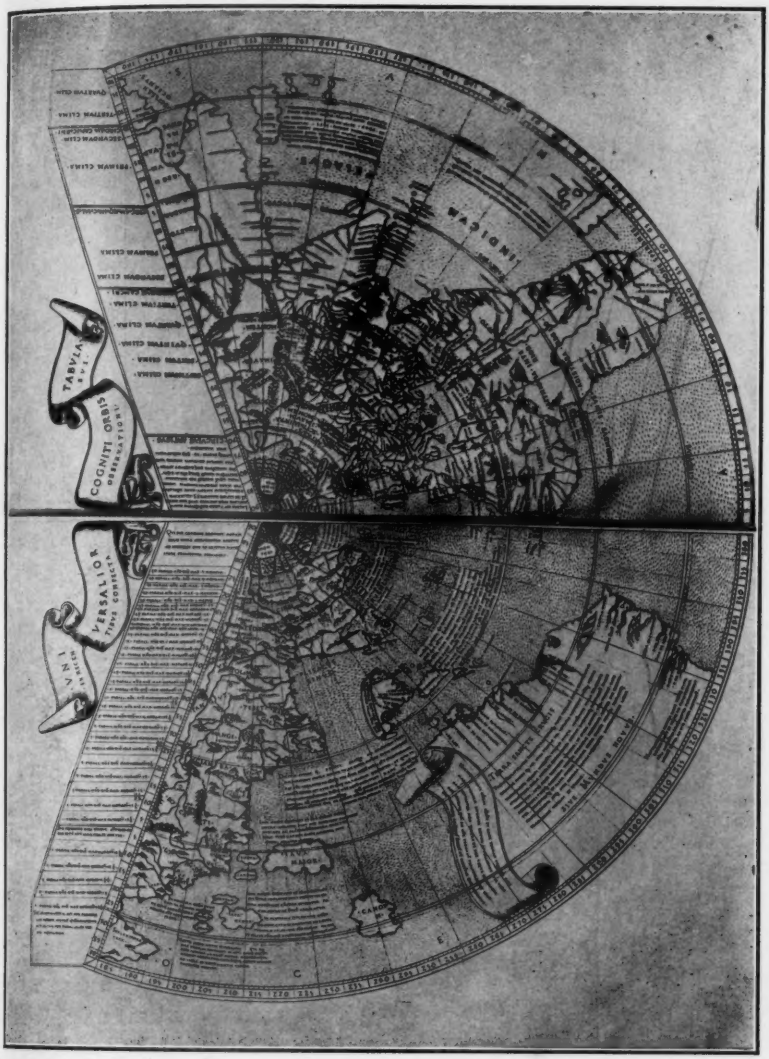
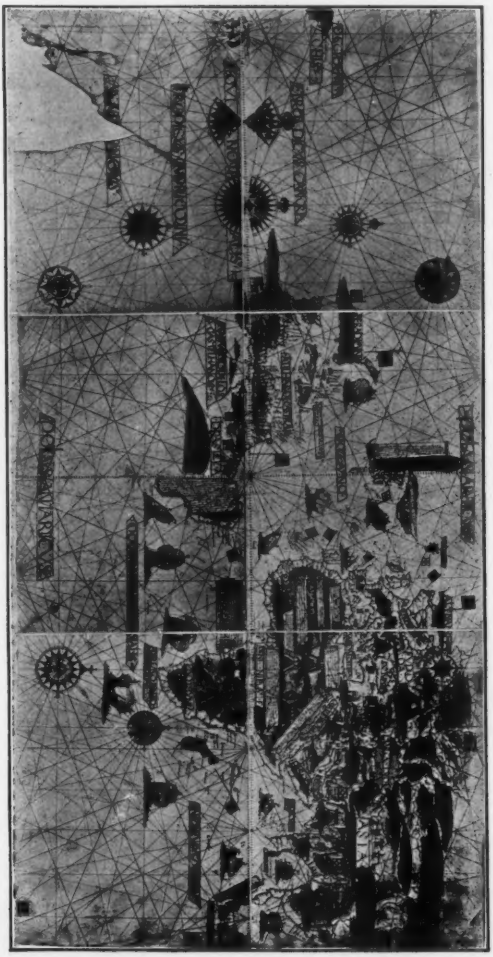


RUYSCH.

or Gomez turned their prows in that direction. Naturally enough, the Ptolemaic maps could not serve as pattern for the new regions, particularly in the west; and it is an interesting fact that in this type we find the first decided break with Ptolemaic traditions for the



MUNICH-PORTUGUESE (1516)

regions of India and the east beyond. It was this early Portuguese type which, finding its way into Germany, became the basis of a most important series of maps of the New World, of which I shall speak later.

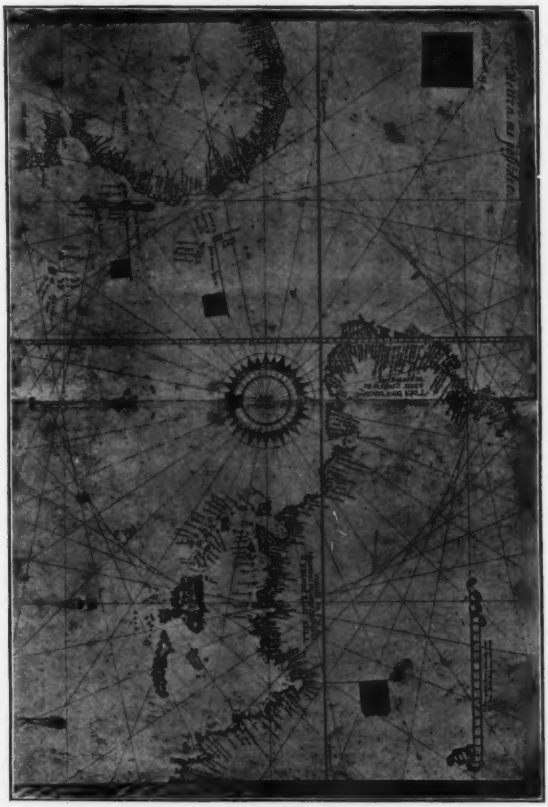
The Ruysch map, to be found in an edition of Ptolemy, printed in Rome in the year 1508, may be considered as representing an early type, although, like the Juan de la Cosa, it seems not to have exerted a very marked influence on the cartography of the period. Until recently it enjoyed the reputation of being the oldest-known engraved map on which the New World appeared. Concerning the question as to whether the new lands were a part of Asia, it seems to represent a compromise. Greenland and the Newfoundland regions are laid down as a part of the Asiatic mainland; while a legend forming the western border of one of the northern islands tells that Zipango has been omitted because that island is thought to be identical with the one touched by the ships of King Ferdinand, and a legend to the south, in defense of the term Mundus Novus, states that that region is so called because of its great extent.

The map seems to show some kinship to those early Portuguese maps in which the newly-discovered lands are represented as a group of islands, but gives evidence of an advance in knowledge the exact source of which is unknown.

The type of map produced in Germany to which I have alluded, and which I shall call Lusitano-Germanic, is especially noteworthy.

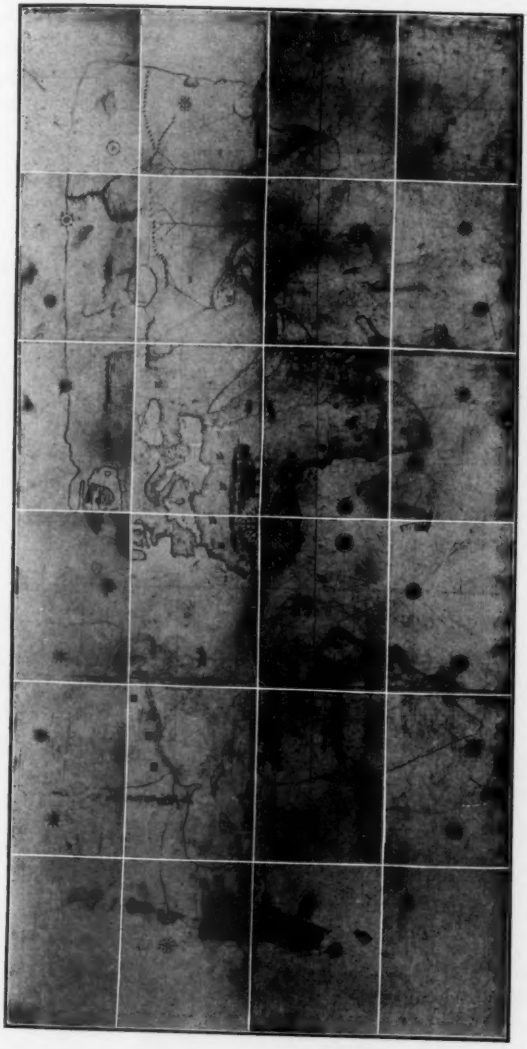
Its origin seems to date from the arrival in the village of St. Dié, Lorraine, of the Vespuccian Letters and a marine chart from Portugal, to which Lud refers in his little work the Speculum. Here was material, through Duke René's coterie of learned men, which, if worked into an edition of Ptolemy, then in preparation for the press, would give that edition an added interest in the eyes of the scientific world. Especial interest now centres in the cartographical work produced in that little village where Renaissance culture flourished under enlightened patronage. Among those most prominent in that learned circle, to which the name Vosgian Gymnasium was given, none is better known to fame than Martin Waldseemüller, who won distinction through his interest in cosmography. He has long been popularly known as the one who first suggested the use of the name America for a part of the new region, fortune favouring in time a use of the name for the entire continent. But there is none the less interest now centring in the maps of which he was the author than there has been in the circumstances under which he had first proposed the name. The first of his maps—one to which he repeatedly alludes in his little book Cosmographiæ Introductio—is the one of which Professor Fischer recently was the fortunate discoverer, and which is attracting so greatly the attention of students of cartography. Its interest, however, for this paper lies in the type of

which it is the most conspicuous example—indeed, of which it seems to be the original. Not to enter too minutely into details, it may be noted that it clearly follows Portuguese originals for the recently-discovered regions, and Ptolemy, in the main, for the countries known to that ancient cosmographer. There can be little question



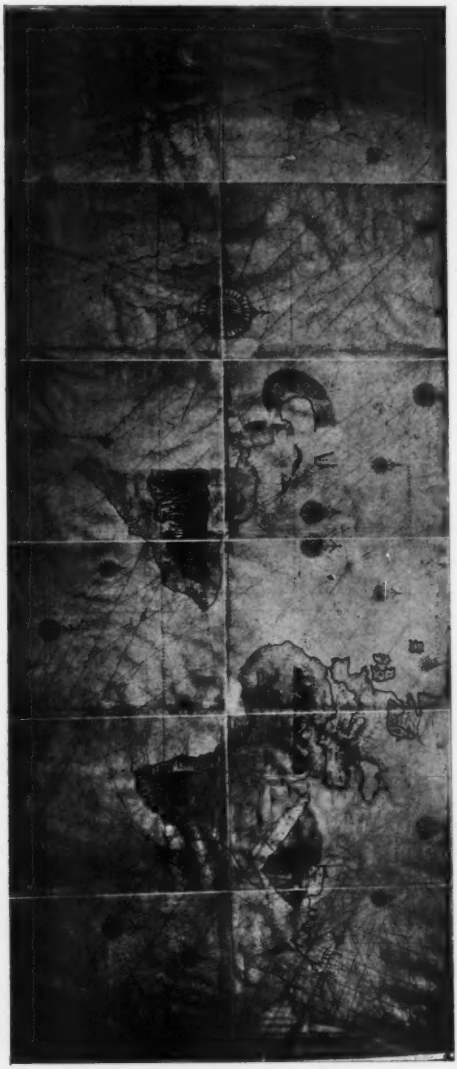
MAGGIOLO.

that Waldseemüller had the marine chart of Canerio, or one almost identical with it, before him while he was at work on his world map of 1507, and especially when working out his map of 1516. Proof positive we do not have that a large part of the information here recorded concerning the New World is from Vespuccian data, but there is much which suggests it. It is noteworthy that Waldseemüller exhibits in his map of 1507 the two forms to be met with in



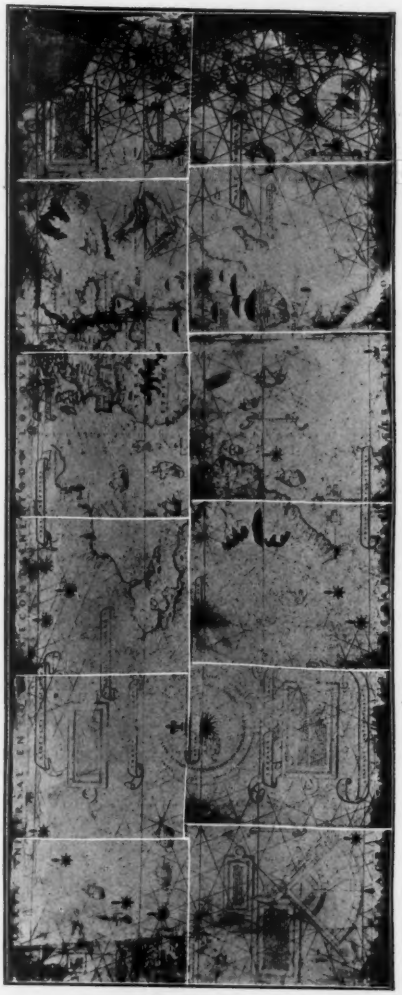
VERRAZANO.

the type, indicating as he does, in the small inset map which he has introduced at the top, a land connection between North and South America, while on the large map he has laid down the body of water which is generally indicated on Portuguese maps as flowing between them—that is, the strait, as it is often called. He has shown great originality in the projection chosen for his map. He clearly expresses the belief that an ocean lies between the new regions and Asia. He locates the Cortereal discoveries far to the northeast of the north continental area, as was often done, that it might lie east of the Line of Demarcation, hence within Portuguese territory, and he gives to the south a terminus in almost its proper latitude. It is on the maps of this type that the name America is geographically fixed for the first time. The type is a prevailing one for many years, particularly in Ger-



TURIN-SPANISH.

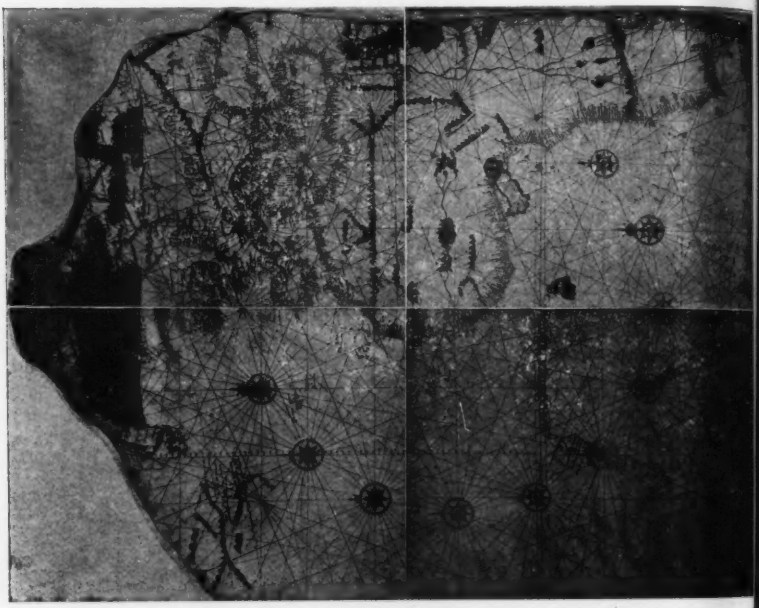
many; and the map-makers of that country, especially during the first quarter of the century, held first rank among those who attempted to represent pictorially the New World. Even late in the century we find the type exerting an influence, although, through the continued accumulation of information, the early outline was somewhat refashioned. The type includes many maps *in plano,* to use an expression of Waldseemüller, among which the New World maps first appearing in the Strasburg edition of Ptolemy of 1513 and in many editions thereafter, the maps of Glareanus, Stobnicza, Apianus, Frisius, Münster, and Honterus are prominent. Of the globe and gore maps which reproduce the type there is likewise a considerable number, of which the Hauslab, the Nordenskiöld, the Tross, and the Schöner gores are conspicuous examples.



WEIMAR-SPANISH.

With the exception of the rough pen-sketch maps attributed to Bartholomew Columbus and discovered but a few years ago by Professor Wieser, none of the early maps clearly indicate a belief in an Asiatic connection of the western lands. Quite the contrary, as I have stated. It is not until about 1526 that we meet with an interesting reversion to the idea which

Columbus professed to have entertained. Some of the students of cartography attribute this reversion to the letters of Cortes, and to the observations of Peter Martyr in his Enchiridion. By others the type is thought to have been derived from Schöner's globe of 1523 and a small tract which he wrote in that year. For many years after 1526 the idea of an Asiatic connection found favour with certain cartographers, and was often repeated. It seemed to come and go with the years from this time on as fact or fancy dictated, until the discovery of Bering put an end to the controversy.



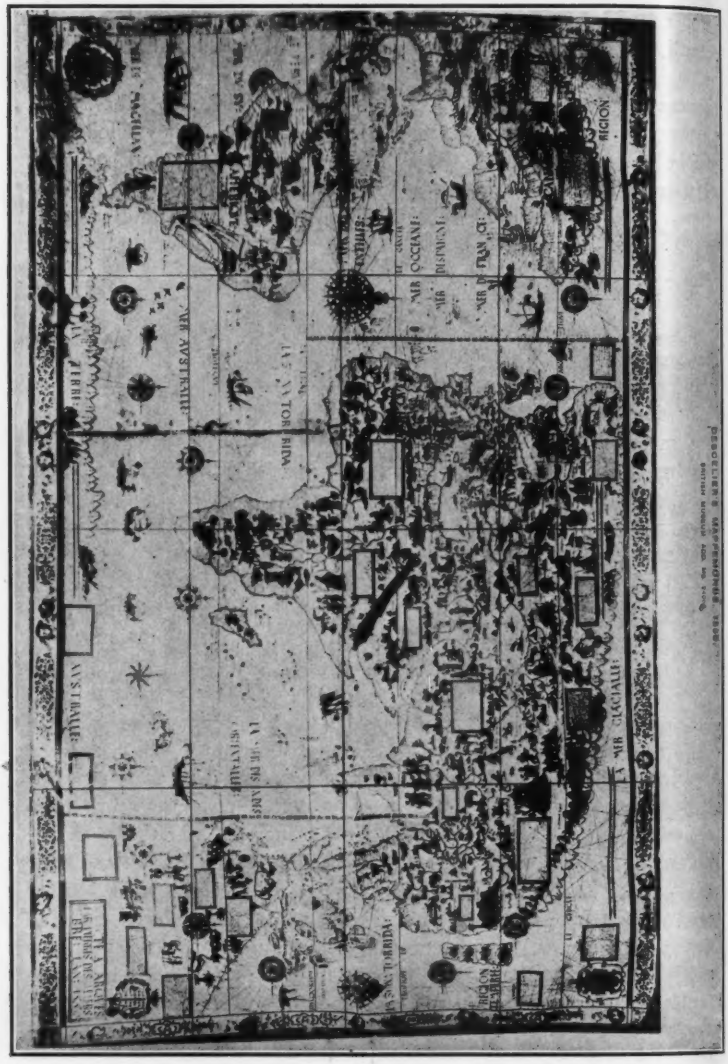
PILESTRINA.

In a work by Franciscus Monachus of Belgium, which he called "De Orbis Situ," and which was printed in Antwerp in the year 1526, we find the idea of an Asiatic connection expressed—and unmistakably so expressed—for the first time after the Columbus maps. Franciscus takes occasion in his text to criticise the Ruysch map of 1508, which indicates that the north continental region is separated from the south. He further states—what he found to be a common belief—that a sea existed between the New and the Old World: that is, between America and Asia; but to this opinion he likewise ob-

jects. The map is crude, and exhibits, in addition to the Asiatic connection, a continuous Atlantic coast-line, excepting the representation of a doubtful strait, from the extreme north to the extreme south, and is among the first to lay down an austral continent. The type is represented by a number of maps before the close of the century, including the Paris Wooden and the Gilt Globe, the Sloane manuscript map, the 1531 map of Finæus, the Nancy Globe, the Globe of Gaspar Vopel, the Schöner Globe of 1533 and a British Museum manuscript map of about 1528, here chosen to represent the type. It finds an interesting modification in the Gastaldi map of 1548 and in the map of Homem of 1561, in which both an Asiatic and a European connection are indicated.

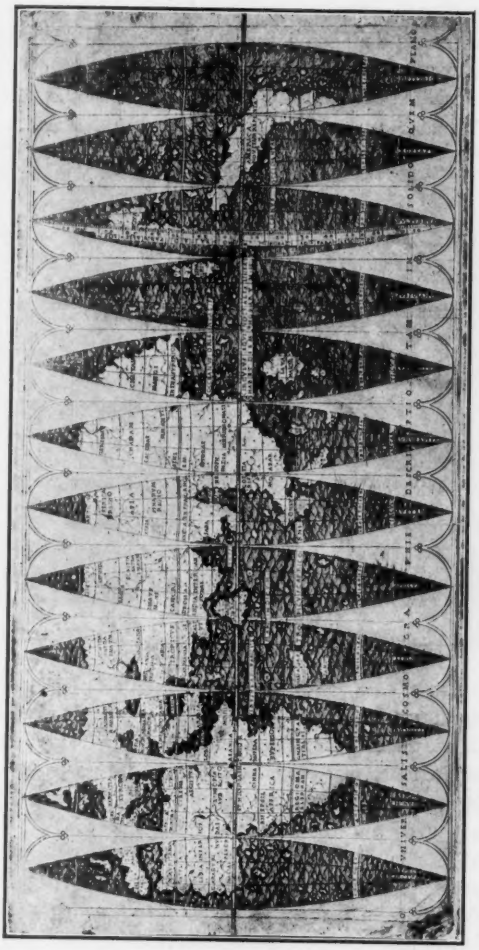
If in the maps constructed within the earliest years of discovery there should be a decided lack of agreement in the position, extent, and contour of the new lands, the fact should not be considered a surprising one. The charts were of various origins. It was very early in the sixteenth century that this diversity began to lead to confusion in territorial claims, and was noted as an element of danger for navigators. In 1508 the Spanish Government took steps calculated to insure the use of correct charts by captains sailing for the new lands from Spanish ports. It was ordered in that year that an official map—a *padron real*—should be drawn, upon which should be laid down "all the lands, and islands of the Indies hitherto discovered and belonging to the crown," and that pilots should mark on this map "every land, island, bay, harbour, and other things new and worthy of being noted." Information acquired by the navigators should be immediately reported to the Pilot Major on return from the voyage. The discovery of this first pattern map would prove to be of great interest and importance.

Between the issue of the royal order and the date of the oldest-known Spanish map, which seems beyond question to have been fashioned, in its main features, upon principles laid down in the decree, nearly twenty years intervene. Yet we know that efforts were not wanting in this period to make the decree effective; indeed, there are two or three important maps extant which have been thought to be, in part, copies, though considerably modified, of official pattern maps. We learn that about 1515 the Pilot Major Solis had constructed such a map, and that it was one of the documents laid before the Junta of that year which had been called together to settle disputes between Spain and Portugal respecting claims to lands in the west. The Solis map we do not now possess; but Kohl thought that we have in the Maggiolo map of 1519 a reproduction of its South



DESCELIER, 1550.

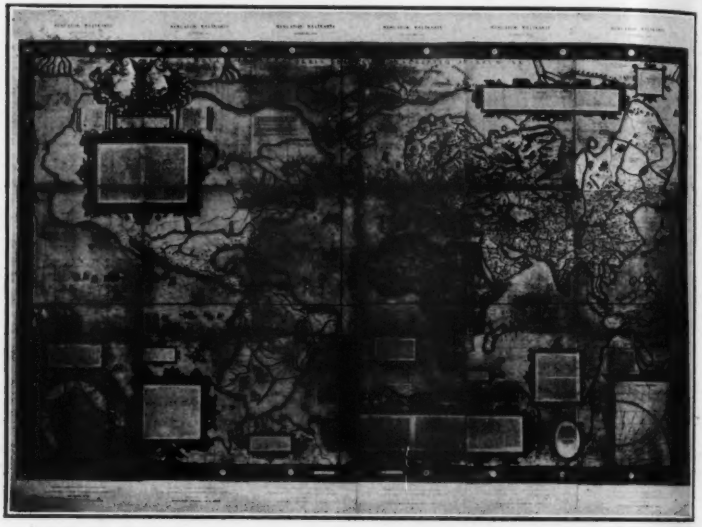
American part which especially emphasizes Spanish claims, and that in the Munich-Portuguese map of about 1519 we have a Portuguese modification of the same. It is interesting to note that in this last-named map, for the first time, the Line of Demarcation represents the Prime Meridian, and Florida is called Terra Bimini. In these, then, we may have what were intended to be specific types—that is, pattern maps. If the Maggiolo map referred to may be taken as representing a section of the Spanish pattern map for that early date, it seems probable that in the Turin-Spanish map of about 1523 we likewise have a transcription of the official map, and a map with fuller data. It is an anonymous map, the richest of the century in nomenclature for the regions indicated. It represents Florida (isla Florida), perhaps, from Ponce de Leon data, the Gulf region clearly from the Cortes sketch, and South America, including data as late as that obtained from the Magellan voyage (see "Tierra dizembre" on the Pacific coast).



TROSS GORES.

It was in 1526 that the order was issued for a new padron real to be constructed under the direction of Ferdinand Columbus, president of the Junta called to meet that year. Kohl believes that the anonymous Weimar map of 1527 is the work of that Commission.

While it is very doubtful that Columbus was the author of that map, nor with any greater degree of certainty is it to be ascribed to Garcia de Torino, and while it is also doubtful that it is an official pattern map, it at least appears to be one constructed from data furnished by the Casa de Contratación. It fulfills the conditions of



MERCATOR.

a pattern map, at least, in laying down a more nearly complete record of western exploration than had hitherto appeared, including an unbroken Atlantic coast-line from about 60° north latitude to 54° south. It represents a type which in succeeding years was often reproduced after Portuguese cartography began to yield in importance to that of Sevillan origin. A most striking contour feature of the type is the very rapid trend to eastward of the Atlantic coast-line of North America—a feature which is almost a distinguishing mark of Sevillan influence.

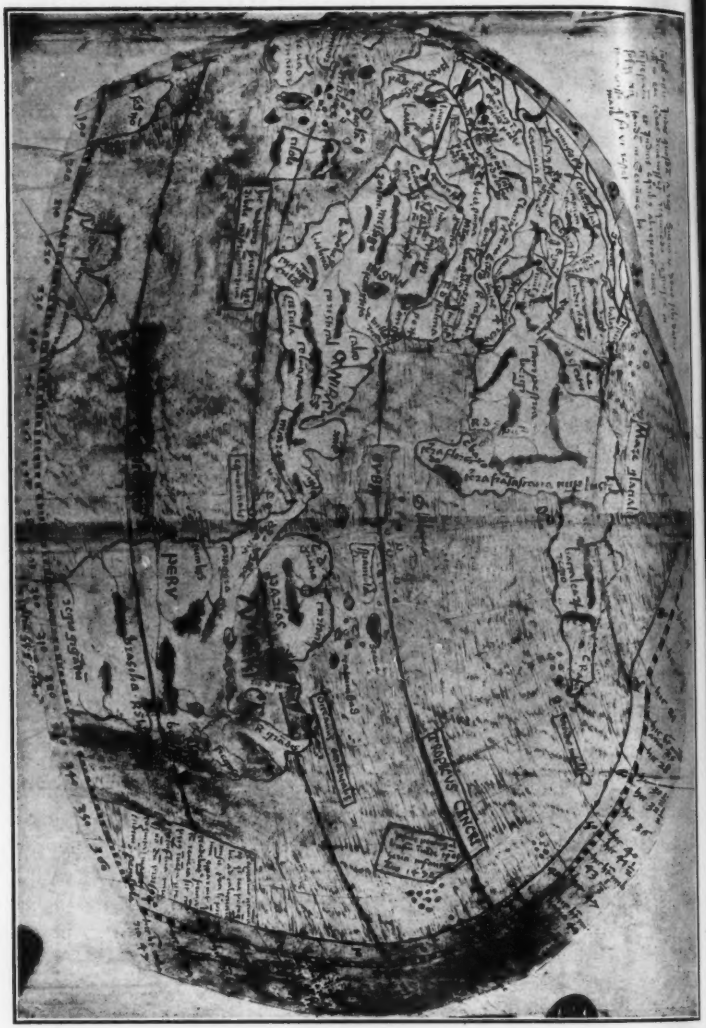
These maps are the first to make record of the discoveries of Ayllon and Gomez. They lay down only so much of the Pacific coast-line as had been explored and reported to date, and they elimi-

nate what had appeared in earlier maps as in large part conjecture. To this type belong the Ribero maps, the Weimar-Spanish of 1527, the Wolfenbüttel map of about 1529, the Agnese maps, with very many others.

There is a type of early maps based, it seems, in its most striking features, on the Verrazano voyage of discovery, which first appears in the Maggiolo map of 1527. Although presenting a continuous Atlantic coast-line, as the Spanish type above referred to, broken only on the Maggiolo map by a "streto dubitoso" south of Yucatan, the type is clearly not from a Spanish original. The nomenclature indicates as much, as does also the trend of coast-line northward from the peninsula of Florida. A most striking feature of the type is the peculiar contour of the west or Pacific coast. South America thus early is given a complete coast-line, although on the west, in the earliest of the type, it is "terra incognita," while from the Central American region the Pacific coast-line sweeps northward with a wide, extended curve, and, almost parallel with the coast-line of the Gulf of Mexico, approaches the Atlantic coast not far from the region of Cape Hatteras. Here, says the Verrazano map of two years later date than the Maggiolo map, is an isthmus six miles wide. On the land which broadens to the north we read on several maps of the type the evidence of French discovery in the name "Francesca" or "Nova Gallia," with such coast names as "Diepa," "Anaflor," "Anguileme." The water on the west of the isthmus referred to becomes on some of the later maps of the type "The Sea of Verrazano." The type is one often reproduced, and is well represented in the Maggiolo 1527, the Verrazano of 1529, the Münster of 1540, the world maps of Agnese, and the Lok map of 1582.

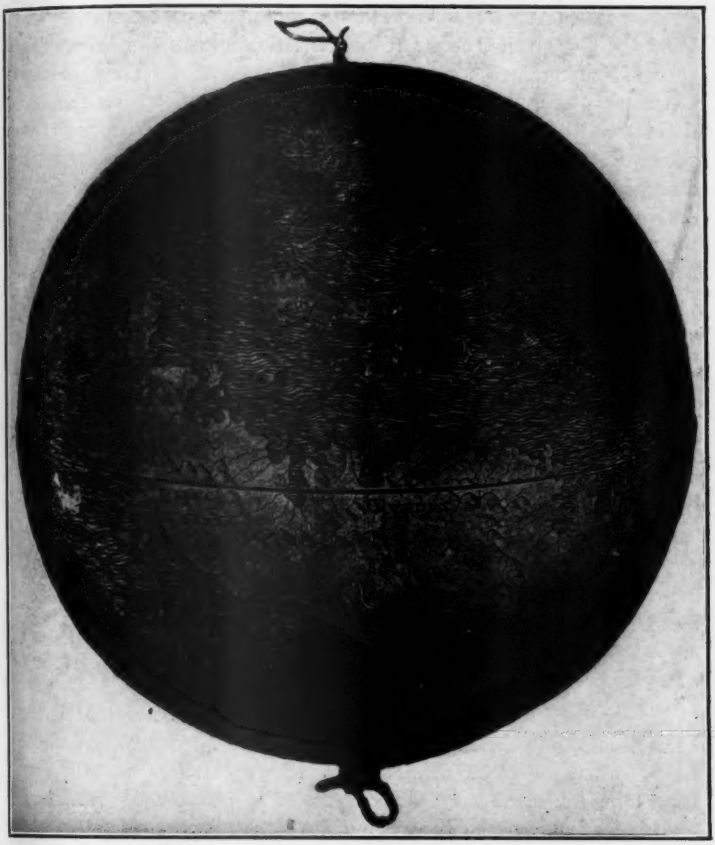
Not until the Cartier voyages of discovery does there appear a prominent French type of early New World maps. As the most important of the early Spanish maps seem to have been the work of the Seville cartographers, so the early important French maps appear as the work of a Dieppe school, to which school belong such cartographers as Desliens and Desceliers. While the work of the Dieppe school seems to have been fashioned to a considerable extent on Spanish originals, Portuguese influence is likewise pronounced. The sources, indeed, seem to have been many, and the draughtsmanship to have been of a high order.

All maps of the type show a continuous Atlantic coast-line, with a fair degree of accuracy. The South American coast is complete, while the interior region of North America is now sketched with some detail. Very naturally, the north Atlantic coast—that is, the



BRITISH MUSEUM MANUSCRIPT.

region in the vicinity of the Gulf of St. Lawrence—is now given with a near approach to accuracy. In most of the maps of this type considerable artistic skill is exhibited. Pictures are numerous, suggesting a return of the idea so pronounced in the most important mediæval maps. To the work of the French cartographers referred



LENOX GLOBE.

to, as best representing this particular type, may be added a few which, in nomenclature, appear to be of Portuguese origin.

Although toward the close of the first half of the sixteenth century a few maps were drawn which indicated with an approach to

accuracy the contour and correct relative size of North America, and its separation by a strait from Asia, it is the Mercator world map of 1569, the first of importance, on which these features are well presented. While the new—and, in the main, original—projection employed by Mercator in this map led to great distortion in the extreme northern regions, the type of which it is the most conspicuous example presents the New World as a continent apart from the Old World. The strait leading from the Atlantic into the South Sea, so conspicuous on the early Portuguese maps as on the Lusitano-Germanic maps, above referred to, has disappeared, as has the very rapid trend of the Atlantic coast-line of North America, so characteristic of early Spanish maps. Verrazano's Sea has likewise disappeared, and the Pacific coast-line is complete, although as yet drawn, in great part, according to conjecture. There are many special features of the type, to one of which only will reference here be made, and this is the peculiar trend of the lower Pacific coast of South America. For this inaccuracy no satisfactory explanation has been given. It, however, is a marked feature of the Mercator maps, reappearing in the Ortelius, the Myritius, the Cornelius de Judæis, and in a number of other maps in which the Mercator influence is decidedly traceable.

It will not for one moment be contended that maps of this type give us a correct presentation of the Western Continent; the errors are still numerous. We do, however, have the Western Hemisphere, as has been said, with outlines approaching accuracy.

THE MIKKELSEN-LEFFINGWELL EXPEDITION.

The Society received, on March 9, a letter from Captain Ejnar Mikkelsen, joint commander with Mr. E. K. Leffingwell of the Anglo-American Polar Expedition. It was written at Flaxman Island, on the northeast coast of Alaska in about 146° W. Long. The letter was probably written in September or October last. Means were found to send it south, and it is marked as received at the office of the Royal Mounted Police, Dawson, Canada, on Feb. 17, 1907. The letter follows:

"The season of ice navigation has been so unfavourable that the expedition could not reach the desired winter quarters in Minto Inlet. The chance of attaining that point in Prince Albert Land

was very small, and we decided not to run the risk, but to go into winter quarters where we were certain that work of value could be done. The expedition has reached Flaxman Island, about 240 statute miles west of the Mackenzie River delta. This will be our winter quarters.

"If it had not been for the kindness of Captain Cottle, of the steam whaler *Belvedere,* and the interest he took in our work, we probably could not have passed Point Barrow. He took us in tow and brought us through the heavy ice to the north and east of Point Barrow. With the wind and the strong current against us, it would have been almost impossible for our little sailing vessel, unaided, to pass east of Point Barrow, which would have been unfortunate for our enterprise, as we should have been compelled to make long preliminary trips in small parties to our various working grounds, which would have weakened our parties and exhausted our supplies.

"But we have reached the place from which the primary purpose of the expedition, the exploration of Beaufort Sea, may be followed, possibly with greater advantage than from any other place in the Arctic except from Cape Prince Alfred.

"The *Belvedere* left us a little west of the Thetis Islands, and we beat eastward in open water. At Cross Island, the ice pack was close inshore, and a few miles further east our progress was stopped by the pack, which hung close to the sand spits marking the outer limit of the lagoon-like stretch of water between Flaxman and Thetis Islands. The lagoon was open, and we could do nothing else than enter it and beat eastward in shoal and narrow water. We soon saw that we could not go outside again, as the ice to the east was pressed hard on the land. On Sept. 10 we gave up further attempt to reach Minto Inlet this season. If a fair wind should drive the ice off shore, we might work further eastward this fall; but at so late a date we could not reach Minto Inlet, and would be forced to winter on the coast in some place less suitable for work than Flaxman Island.

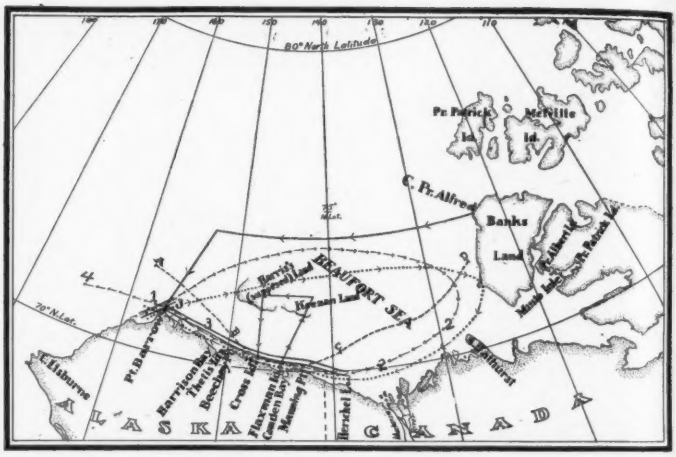
"We have seen the actual conditions here, and whalers have told us of their long experience in this region. We have, therefore, been able to collect valuable facts that have a bearing on the question of the land which is believed to exist in the Arctic Ocean north of Alaska.

"The reasons for believing that this land exists, as summed up by Sir Clements Markham and Dr. R. A. Harris, are (1) the very slight movement of the heavy pack ice off the American coast, (2) the small diurnal range of the tide, (3) the land reported to have

been seen by Captain Keenan, and (4) the reports of Eskimos of Point Barrow and eastward concerning land to the north.

"Heavy and persistent fogs have allowed us only occasional glimpses of the pack ice, but from the little we have seen of it we have no doubt that it is heavier than the ice met in the waters of Greenland and Franz Josef Land.

"We know to our cost that the pack is slow in movement and



EXPLANATION OF THE MAP.

The broken line A, B, C, D, shows approximately the southern edge of the ice pack in the most favourable ice years. Between A and B whalers can go as far north of Point Barrow as the line indicates only late in August or early in September. Between B and C the ice edge is close on land in all seasons. East winds push the ice on Cross Island, and west winds, on Manning Point. Between C and D the edge of the ice pack in summer is far off shore, and whalers can steam farthest north when the winds are east or south-east.

The two parallel black lines show the water crack that is usually open in the spring. Spring whaling is carried on at Point Barrow in this crack.

The line of arrows shows the probable route of the whale in these waters and the figures indicate the catch seasons as follows: 1—late in April and during most of May; 2—the latter part of July and early in August; 3—the latter part of August and beginning of September; 4—the latter part of September.

The line of dots with arrowheads shows the probable route of geese and ducks to breeding places on the conjectured land and on Banks Land, and their return route along the coast in the fall.

The solid black lines with arrowheads show the proposed sledge routes over the sea ice, this spring and in the spring of 1908 in search of new lands, as explained in the text.

prone to lie near the land. At Point Barrow the pack recedes from the coast, save in exceptional years, such as this one; but further east, toward Cross Island, the pack ice, according to the whalers, is almost always within sight of the coast.

In passing Cross Island this year, the whaling fleet had to sail in three fathoms of water to get around a tongue of pack ice. When

we passed the same place a fortnight later, the tongue of ice had moved two or three miles east and was close on to the land. The whaling fleet has trouble almost every year in passing Cross Island.

"In the spring, there is usually a narrow lane of water in the pack to the north of Cross Island some twenty miles off shore, where the Eskimos carry on their spring fishing. The pack outside of this lane of water seems motionless except for a slight movement perpendicular to the coast. Along other coasts—north of Point Barrow, for example—the ice is in motion all through the year, and the movement is greatest in the spring months.

"One of the most frequented whaling grounds is north and northwest of Point Barrow, and the whalers are often able to go far from land in those directions. English explorers, also, have penetrated 180 miles northwest and 85 miles north of Point Barrow (directions true).

"From Herschel Island, also, whalers are able to go quite far north, and this year, late in July, vessels sailed between 50 and 60 miles true north from the island without meeting any floating ice; and a dense water sky indicated water still further to the north. This is not exceptional. Year after year, whalers are able to repeat these voyages. McClure in 1850 attained 75 miles north of Herschel Island, where the pack stopped him. The sea is almost invariably open early in the year to the north of this part of the coast. But at Cross Island and the coast in its neighbourhood the conditions are different. No navigator has been more than a few miles north of the coast, excepting Captain Keenan, who claimed to have seen land.* Unfortunately, his data are lost, and his position is open to conjecture. As far as can be learned it was between Cross Island and Beechey Point. This heavy and almost immovable ice certainly indicates the existence of land in the unknown sea beyond.

"Captain Keenan is dead, but the whalers, who knew him, agree that he was a very reliable man. They say he would not have reported that he had seen land if he were not positively sure of the

* The late Marcus Baker, in the National Geographic Magazine (Vol. V), wrote the following facts as they were told by Captain Edward P. Herenden, a whaler:

"The only report of land having been seen by civilized man in this vicinity was made by Captain John Keenan, of Troy, N. Y., in the seventies. He was at that time in command of the whaling bark *Stamboul*, of New Bedford. Captain Keenan said that, after taking several whales, the weather became thick, and he stood to the north, under easy sail, and was busily engaged in trying out and stowing down the oil taken. When the fog cleared off, land was distinctly seen to the north by him and all the men of the crew; but, as he was not on a voyage of discovery, and there were no whales in sight, he was obliged to give the order to keep away to the south in search of them. The success of his voyage depended on keeping among whales.

"The fact was often discussed among the whalemen on the return of the fleet to San Francisco in the fall. The position of Captain Keenan's ship, at the time land was seen, has passed from my mind, except that it was between Harrison and Camden Bays."

fact. Several men of his crew have been shipmates with whalers now in these waters who report that Keenan's crew were certain that they had seen land and described it as high, rolling country.

"Dr. Harris's argument, based upon tidal action as indicating land to the north, would be worthless if the tidal observations were wrong. But these observations were made by two or three different observers, and it is not likely that all would be mistaken in the results of their tidal work. We cannot reject the observations of such men as Dease, Simpson, Franklin, and others, whose studies of the ice and tides certainly lead to the conclusion that there is land to the north of Cross Island and the adjacent coasts.

"The Eskimos near Camden and Harrison Bays say that in the brightest days of early spring they can see land far to the north. There are Eskimo legends, also, that members of their tribe were once driven to this land by a southerly gale and told about it when they succeeded in returning to the mainland.

"The whalers at Point Barrow go out on the pack to a lead which opens in the ice every season and harpoon whales as they travel in this channel to the northeast. Where the whales go will probably not be known until Beaufort Sea is well explored. The trend of the crack is away from the coast, and the whales use it to reach some feeding ground where they are not disturbed. The Eskimos and whalers agree that they have never seen whales travelling east along the coast in the spring.

"It is not till late in August and early in September that they catch whales in the region of Cross Island and westward, when the whales are migrating to the west and south. When the ice opens at Herschel Island it gives the whalers a chance to sail east, and they usually secure fine catches between Banks Land and Cape Bathurst, just as the whales are coming from the northwest.

"These facts throw some light upon the migration of the whale. It disappears from Point Barrow, in a northeast direction, in the latter part of May, and no signs of whale are seen along the coast of the mainland till the latter part of July, when whaling begins between Banks Land and Cape Bathurst, the whales then coming from the northwest. When the animals leave the waters south of Banks Land, they travel along the coast to the west. It is thus seen that the whales make a large circuit to the north of Alaska, starting northeast near Point Barrow, reaching the coastal waters again at Cape Bathurst in the east, and completing the circuit by returning westward to Point Barrow along the shore.

"Where do the whales go after leaving Point Barrow in the

spring? They probably follow the water lead, which perhaps takes them to the north of the supposed land mass.

"It is hard to understand why the ice pack should open and year after year supply the whales with a channel passing through it by which they can travel far to the northeast. The only reasonable explanation is that there is land of some magnitude in the north from which the ice recedes in the spring.

"Myriads of birds pass Point Barrow in the spring, travelling, like whales, to the northeast. It is well known that a great number of them must breed elsewhere than on the mainland; for they do not live on this coast, but pass over it to the north, and are not seen again till in the fall, when they are travelling south. Geese come from northward to Herschel Island as late as August 18. Geese and ducks, like the whale, follow the coast closely in going west in the fall.

"Considering all these facts, it does not seem to me that we are too optimistic in expecting to find land not very far to the north of the Alaskan coast. Here are our plans for next spring:

"Early in 1907 a party of two or three men will strike out on the ice from Flaxman Island towards the true north-northeast. After following this direction for about 150 miles, the party will travel westward, parallel with the Alaskan coast, for about 100 miles, and thence will march due south to Cross Island. The party will take soundings all along the route whenever opportunity occurs.

"This journey, in connection with the sledge trip which we shall make from Cape Prince Alfred on Banks Land in the spring of 1908 towards the west, should solve the problem as to the existence of land of any magnitude between 76° N. Lat. and the coast of Alaska."

A Letter from Mr. Stefansson.

The Society has received a letter from Mr. V. Stefansson, the ethnologist of the Anglo-American Polar Expedition. It is dated Shingle Point, Arctic Ocean, Nov. 17, 1906. This is in the neighbourhood of the Mackenzie delta. Mr. Stefansson reached the Arctic by way of the Mackenzie, while the rest of the party took the sea route in their vessel. His reason for so doing was the possibility that the *Duchess of Bedford* might not reach Cape Bathurst last year (as proved to be the case), and he did not wish to be stranded for a year, unable to reach the people whose ethnology he was expected to study—the so-called Kogmollik Eskimos.

He reached Herschel Island on Aug. 9, and found most of the

whalers waiting for the steamer that every year brings coal and other supplies. Late in August, the whalers gave up hope that the supply ship would arrive, and started west to get through the ice, if possible, and sail home. They offered to take Stefansson with them to meet his ship; but he declined to go with them, as there was a large chance of missing his vessel if she were on the way west. Mr. Stefansson continues:

> In planning to come by the river route, I had considered the possibility of my ship not coming, but I was assured that the supply steamer had never failed to penetrate to Herschel Island. She brings all sorts of supplies, and sells them practically at San Francisco prices. I, therefore, brought only summer clothing, such books as I expected to use on my way down, my camera, and rifle. . . .
>
> When I had determined to stay here [instead of going with the whalers], Mr. Harrison, an Englishman, working under the auspices of the Royal Geographical Society, kindly offered to let me share his camp. He had five rifles, about 10,000 cartridges, a good camping outfit, dogs, a whale boat, and three native families already hired. This was a windfall for me, though he had almost no provisions—about three weeks' supply for his party, consisting chiefly of gasoline-soaked flour, that the ship's crew had refused to eat.
>
> We left Herschel Island late in August, and came to Shingle Point. Here I remained behind in a Kogmollik village, living on fish exclusively (and no salt, either) for a month, while Mr. Harrison proceeded inland to the south end of Eskimo Lake, some thirty miles east from a point 20 to 30 miles north of the junction of the Peel River with the Mackenzie. The lake is either absent from most maps or is incorrectly placed.
>
> I dared not leave the coast before the young ice formed and made the ship's coming impossible. Up to early in October I lived with my Kogmollik host very pleasantly. The first week in that month it froze up and we moved into his sod house, fifteen persons in one small room. Two members of the family had consumption, and the prospect was not pleasant. Fortunately, a Danish sailor, married to an Eskimo woman, had come here from Herschel I. to build a house, which turned out a fairly good one, with a glass window. He also had plenty of coal oil and good lamps. I, therefore, made it my excuse that I wanted good light for writing and moved into his house. . . .
>
> I shall go in a few days to join Mr. Harrison. If he has been so fortunate as to procure food, I shall remain with him. If not, I shall come back here.

Mr. Stefansson adds that though the ice conditions to the west of Herschel Island had been very bad, navigation was excellent to the east. The west coast of Banks Land was free from ice as far as the whalers went, and so was the east coast, at least to Minto Inlet. The whaler *Narwhal,* leaving Herschel Island on Sept. 7th, went to Cape Bathurst, thence up along the west coast of Banks Land, then west to 180 miles north of Herschel Island, and finally south, without seeing a cake of ice.

Mr. Leffingwell left the *Duchess of Bedford* in October to make an overland journey of about 150 miles from the winter quarters of the ship, in order to deliver the mail to the three mounted policemen stationed at Herschel Island. One or two overland mails pass between the mounted police stations from Herschel Island to Dawson in winter, and in summer one or two mails are carried by the steamers on the Mackenzie. Mr. Leffingwell wrote to his father, at Knoxville, Illinois, that he had a difficult journey of five weeks between Flaxman and Herschel Islands. He has probably returned to the *Duchess of Bedford,* in order to participate in the

spring sledging over the Arctic Sea, as outlined in Captain Mikkelsen's letter above.

At the time Mr. Stefansson wrote he had not seen Mr. Leffingwell. If he met him later, the plans outlined in his letter to the Society may have been changed. He adds that after joining Harrison, they expected to hunt eastward from Eskimo Lake, and hoped to cache deer meat towards the Anderson River and perhaps as far as the Horton (River la Roncière). With the lengthening days in March they planned to sledge eastward with one team and two or three Eskimos to the mouth of the Coppermine River, and then return along the coast, mapping it if there was time. Mr. Stefansson expected to be back at Herschel Island late in July to meet the *Duchess of Bedford*. His letter concludes:

I am spending the winter very profitably. The house is full of Eskimo talk all the time, though there are two white men in it. I am learning the language, and am gaining an insight into the native character and familiarity with the native habits.

GEOGRAPHICAL RECORD.

AFRICA.

DELIMITING INTERNATIONAL FRONTIERS.—The total length of international frontiers traversed by British Boundary Commissions in Africa up to August, 1906, is 9,081 miles.

The following are the stages in the business of delimiting an international frontier: First there is an international agreement drawn up on broad lines; each Government then appoints Commissioners, who meet at one end of the boundary and march along it, exploring and mapping the boundary zone. The Commissioners, having arrived at the other end, agree upon the geographical position of the principal features and decide upon the details of the frontier, paying special attention to the incidence of tribal boundaries and to the future nationality of the villages. They then march back along the line, erect pillars and inform the chiefs. A protocol in duplicate is drawn up and signed, and each Chief Commissioner forwards the protocol and maps with a report to his Government. The protocol is then approved by the two Governments, and in some instances a fresh agreement on the terms of the protocol (with, perhaps, minor modifications) is drawn up and signed by representatives of the Governments.

The technical work of boundary commissions has shown steady improvement, and these commissions have had a considerable share in stimulating interest in geographical surveying. Excellent technical work has been carried out by the most recent commissions—the Yola-Chad, the Anglo-German (Uganda), the Victoria-Kilimanjaro, and the Anglo-Portuguese (Zambezi). To these and other commissions we owe much exact geographical knowledge—a most useful asset to the Protectorates concerned.

The delimitation of international frontiers has been an indirect means of surveying some of the outlying portions of the tropical Protectorates. In fact, in most of the British tropical African possessions the perimeter is more accurately mapped than the interior. There are now no "hinterlands" in British Africa, the partition of the continent is complete, and the boundaries are, with few exceptions, well defined. (Annual *Report* of the Colonial Survey Committee to August 1906, No. 500, London.)

Cotton in Northern Nigeria.—The British Cotton Growers' Association estimated, not long ago, that Northern Nigeria would be likely to produce, at some future time, at least 7,000,000 bales of cotton, or sufficient to supply the whole requirements of Great Britain and leave a very large quantity for other cotton-consuming countries. In commenting upon this estimate in his recent report, Sir F. Lugard says that it is based on data supplied by the Association's own experts, after several years of careful inquiry, and is therefore entitled to consideration. He thinks, however, that it is too optimistic, seeing that the development of so large an industry needs a correspondingly large population, which does not at present exist in Northern Nigeria. "But," he continues, "the Kano Emirate is densely populated by an industrious race who are keen agriculturists and have cultivated cotton for 1,000 years. Given a means of transport which can convey the cotton at low freights to the Niger waterway, I anticipate a great development of this industry, which may some day go far towards realizing the hopes of the Association."

It is worthy of mention that not a few whites returning from western Africa say that, even if the growing of cotton for export is possible in the West African countries, it will not be practicable until ample means of cheap transportation are provided, as cotton cannot profitably be carried far excepting at low rates of freight.

AMERICA.

Drainage in Illinois.—Dr. H. Foster Bain, State Geologist of Illinois, is collecting data bearing upon the reclamation of 2,000,000 acres of swamp and overflow lands still existing within the State limits. The advisability of the systematic draining of such lands is nowhere better illustrated than in Illinois. The pioneer settlers chose homesteads along the stream courses where narrow strips of timber afforded shelter and fuel. The open prairie lands near them were in many places overspread with the waters of shallow and sluggish streams for many months of the year. Wide areas of prairie were, for this reason, regarded as so unpromising that they did not bring at auction more than a few cents an acre.

The State Legislature finally enacted drainage laws, and the enormous task of reclaiming large districts slowly progressed. The success of underground tile drainage gave a great impetus to the work. In 1880 large regions in the central part of the State were sold at $20 to $25 a acre. To-day, these lands are worth from $150 to $175 an acre, and are classed among the choice farm lands of Illinois. It is assumed that the drainage of the remaining swamp and overflow lands will be more difficult and expensive and that the private citizen will be unable to bear the burden of the entire work. This is the reason that the Legislature decided upon the investigation which Dr. Bain is making.

As much of this wet land is found along river bottoms, the drainage problem is closely related to that of the improvement of the river channels. Reliable topographic maps have not yet been made of many of these areas, but they will pro-

bably be supplied in the near future through the Geological Survey of the State which is now co-operating with the Federal Survey in the topographic mapping of Illinois.

SALTON LAKE CIRCUMNAVIGATED.—An expedition from the Desert Laboratory of the Carnegie Institution, conducted by Dr. D. T. MacDougal, has recently circumnavigated Salton Lake in a sail boat. *Science* says (No. 637) that the lake was found to have a length of over fifty miles and an area of nearly seven hundred square miles. Although the break in the banks of the Colorado River from which the main channel leads to the lake was closed on February 10, yet minor channels and seepage poured sufficient water into the lake to maintain its level during the month following at the maximum depth. It is therefore to be expected that the present level may be retained for some time, and that the evaporation may not exceed the inflow by as much as fifty inches during the present year. Five stations were located and surveyed for the study of the reoccupation of the basin by vegetation as the lake recedes. A second sunken basin south of the Salton and lying between the Cucopa Mountains and the main range of Baja California in Mexico was traversed by wagon, skirting the shores of a lake which partially fills it. This basin seems to be subject to more frequent overflow from the delta, and during 1905 a lake thirty miles long and fifteen wide was formed, which has now shrunken to a third of the dimensions given. Some important material and data bearing upon the plants and animals living in saline waters, hot springs and clay deserts were obtained.

TERRACES OF THE WEST RIVER, BRATTLEBORO, VERMONT.—The Miller-Davis theory in regard to the origin of river terraces has been tested by E. F. Fisher (Proc. Boston Soc. Nat. Hist., vol. 33, pp. 9-42, 1906). She has applied it to the explanation of the terraces found along West River in Vermont, near its junction with the Connecticut. This theory, as stated by Miss Fisher, is that

> the river terraces of New England may be accounted for by the behavior of meandering and swinging streams slowly degrading previously aggraded valleys without necessary change in volume, and by the control exerted here and there over the lateral swinging of the streams through the discovery of rock ledges.

Prof. Fisher regards this theory as adequate to account for the features noted in the region studied. She describes the lateral swinging of rivers by meanders, cut-offs and short cuts, and gives an account of a fourth process, called the "partition process," which occurs when for any reason the swiftest current of a stream is withdrawn from a bank of erosion, with the resulting formation of a sandbar not continuous with the eroded bank, and therefore parting the stream. The deeper channel eventually acquires the entire stream, the deserted channel and former island are added to the floodplain, and the stream has thus moved laterally a certain distance.

Miss Fisher writes:

> The oldest terraces not only weather to a gentler slope, but, also, their edges are rounded off, which means that a convex slope of erosion is formed above and a concave slope of deposition below. Very excellent examples of this may be found by a careful study of the terraces in our valleys, where the dissection of the highest and oldest terraces has been so excessive as fairly to separate them into individual plains, severed by sharp and deeply incised valleys of erosion. At first sight they appear like delta sand plains with lobate margins.

The writer of this notice suggests, from a study of the excellent illustrations which accompany the article, that some of these high level deposits may be delta-terraces, formed before the ice had melted from the centres of the valleys of the Connecticut and West rivers. F. P. G.

MAPS ILLUSTRATING LAND FORMS.—The United States Geological Survey has selected 100 of its atlas sheets to illustrate a variety of physiographic forms. A list of the sheets has been published as a leaflet, giving under each sheet the principal physiographic form or forms which it illustrates. With the list is a cross-reference list showing the sheets on which each topographic form is illustrated. For example, aggrading streams are illustrated on the Maxwell (Cal.) sheet, alluvial fans on the Cucamonga (Cal.) sheet, anticlinal mountains on the Cloud Peak (Wyo.) sheet, denuded plateaus on the Corazon (N. Mex.) sheet, dissected fault blocks on the Needles (Ariz.) sheet, glaciated topography on the Becket (Mass.) sheet, lacustrine plains on the Amargosa (Nev.-Cal.) sheet, kettle moraines on the Edgeley (N. Dak.) sheet, wind erosion on the Coldwater (Kans.) sheet, etc. It can easily be seen that these atlas sheets with the aid of such a list will prove very helpful to teachers of Physiography.

The set of 100 sheets with the leaflet is sold for $3.

THE MUZO EMERALD MINES.—The largest source of the world's supply of emeralds is Muzo, in the eastern part of Colombia. The Colombian Government, last year, sent an English engineer to inspect the mine, from which the Government derives large revenue. In his report, he says that the mines are situated in the State of Boyaca, a few miles from the small town of Muzo. This district, though hot, is healthful, and water and timber are abundant, the land is fertile, and labour is easily obtainable. The emerald deposits vary in height from 3,000 to 4,000 feet above sea-level. They extend over many leagues, and the Government property alone is estimated at 40,000 hectares. For some time there has been scarcity of water at the mines, and there are other impediments that interfere with the full development of the industry. The report deals chiefly with suggestions for overcoming these difficulties, etc. The engineer estimates that, when the proper improvements are made, the mines, adequately worked, will yield an annual profit of at least $1,000,000. He believes, in fact, that the only limit to production will be the quantity that can be sold without seriously reducing the price of emeralds.

ASIA.

A NEW VOLCANIC ISLAND.—Commander Beauchamp, in charge of the Marine Survey of India, has sent to London a description of Volcano Island, derived from examination made about sixteen days after its appearance above water (*Nature*, No. 1948). The island is off the coast of Arakan in the Bay of Bengal, nine miles northwest of Cheduba Island, and has a greatest length of 307 yards in a S.S.W. and N.N.E. direction, with a greatest breadth of 217 yards in a N.W. and S.E. direction. The summit is nineteen feet above high water. The soundings in the neighbourhood, except close to the shore, appear to be unaltered by the eruption. The island is still in an active condition at the northern end, several hot springs of liquid mud overflowing. It is steeper on the western side.

Temperatures (Fahr.) were taken at different parts, the surface registering 81°, being the same as the atmosphere; at two feet below the surface, 96°; three feet below, 104°. At the observation spot on the summit, evidently the main crater, the temperature at one foot below the surface was 104°; at two feet below, 108°; at three feet below, 138°; and at three and a half feet the temperature rose to 148°. The island is becoming hard; but the sea and tide are washing it away considerably, leaving a wake of discoloured water. The Admiralty

charts show that several mud volcanoes exist in the neighbourhood. The island is composed wholly of grayish-brown mud of uniform quality, intermingled with which are a few angular fragments of rock. These include portions of laminated sandstones—a compact grey rock which has the appearance of a limestone, but is only partially soluble in strong acids; lumps of crystalline calcite, and a soft green stone, probably a basic igneous rock. These must have been thrown up with the mud.

On December 31, the surface was sun-dried and hardened, with a very uneven, nodular, and bubbly appearance, and also split by deep fissures, due to shrinkage in drying. It readily supported the weight of a man. On the north side of the island are several small vents, three of them opening into pools of liquid mud, to the surface of which gas bubbles are continually rising. This gas is not inflammable, and it has a sulphurous smell. The heavy rains and sea action in the southwest monsoon, it is likely, will cause the rapid disintegration and total disappearance of the island, if no more material is erupted.

Rubber in Ceylon.—The official account of the Ceylon Rubber Exhibition, held in the Royal Botanic Gardens, Peradeniya, in September, 1906, gives an excellent idea of the rapid growth of the industry in that island. Five years ago there were only 2,500 acres under rubber in Ceylon, and to-day there are 104,000 acres, the *Hevea brasiliensis* being the species most extensively planted. This tree produces the well-known Pará rubber, which, prepared in the ordinary way, possesses 90 to 95 per cent. of caoutchouc. The account, also, contains the lectures, discussions, judge's reports, etc., which were a feature of the exhibition, and these have been brought together in the present volume and arranged in logical order, with the hope of making this account a standard treatise upon the rubber industry as it now exists.

EUROPE.

Early Exhaustion of the South Russian Iron Mines.—The United States Consul at Riga reports that it is estimated that the iron ore mines of south Russia will be exhausted within the next twenty to thirty years. They are now the largest producers of iron ore in the Empire. When they are no longer available the Ural district is destined to become the largest producer of iron and steel in Russia.

The Geological Society of London.—The celebration of the centenary of this Society will be held in September next. At the February meeting, Sir Archibald Geikie, the President, said that invitations to attend the meetings will be sent to all the foreign members and foreign correspondents of the Society. Geological Societies, Geological Surveys, and learned institutions which have a geological side will be asked to send delegates. The official programme will probably extend over three days in London. In his address, Sir Archibald will sketch the state of geological science outside of Great Britain at the time when the Geological Society of London was founded and indicate the external influences that affected the young Society. Excursions to places of geological note will precede and follow the meeting.

Publication of the Third Volume of Richthofen's Work on China.—Acting on a Memorial presented by the Berlin Geographical Society, the Emperor of Germany has granted the sum of 10,000 marks for the publication of the third

volume of Richthofen's work on China. The Academy of Sciences in Berlin has contributed 6,000 marks and the publisher of the book 4,000 marks, so that its production seems assured.

CALABRIAN EARTHQUAKES.—Two recent articles by Professor W. H. Hobbs* are of more than usual interest to students of seismology. These two articles, illustrated by numerous photographs in the text and plates, and accompanied by a number of interesting tables, clearly prove the passing of the centrum theory of earthquakes which was so long followed by geologists.

Professor Hobbs was *en route* to study the geology of Calabria when the devastating earthquake of 1905 occurred. This earthquake, which cost upwards of 800 lives, and caused nearly complete destruction to numerous villages throughout Calabria, was the most severe which has visited the province since 1785. The instability of the Italian peninsula is attested by the fact that about ten earthquakes are felt there every year, and southern Italy is most seriously affected.

From Prof. Hobbs' careful study of the records of the 1905 earthquake, and from his tabulation of the records of the previous great Calabrian earthquakes, it is evident that the damage is there largely localized either over or near fissure planes, and is to be ascribed either directly to the shearing movement upon these planes or to elastic waves which are transmitted mainly along them. At distances exceeding a kilometer on either side of the fault planes, the shocks for all save the greater disturbances are apparently impotent against well-construed houses. On the maps accompanying this paper the author has plotted the localities of greatest destruction, and from these maps it is evident at a glance that the earthquakes have exercised an apparent selective action, the damaged communes, and especially the ones most seriously injured, being arranged on essentially right lines, which in a general way run parallel to the bases of mountain masses. This result, from the plotting of all the important earthquakes during the last three centuries, is most striking. It happens that the communes are mainly established along the very lines of greatest seismicity—that is, along or near the base of the mountain masses. The principal reason for this has been the protection afforded by precipitous slopes in an age when man was particularly predatory in his habits. An additional reason for the selection is the fact that the olive, fig, and vine grow with special luxuriance in such neighbourhoods.

It is a noteworthy fact that the inhabitants of Calabria have not learned to build earthquake-resisting structures. In fact, the worst possible type of houses for an earthquake district appears to have been constructed and reconstructed through centuries, though the opportunity seems never to have been lost to point a moral after each succeeding disaster. Throughout much of the region houses are constructed from the rounded boulders that abound, and these are cemented by a weak mortar of home production, and roofed with tiles loosely supported upon poles. Prof. Hobbs says: "It is not too much to say that saving to life from proper house construction throughout Calabria would at the time of earthquakes reach fully three-fourths." He points out the fact that after almost total destruction by previous earthquakes some of the Italian communes have been located in new sites, in some cases, through chance selection, having secured a more stable

* On some Principles of Seismic Geology, with an introduction by Eduard Suess (Sonderabdruck aus Gerlands Beiträgen zür Geophysik, Bd. VIII, Heft 2), Leipzig, 1907, pp. 219-292; and The Geotectonic and Geodynamic Aspects of Calabria and Northeastern Sicily, with an introduction by the Count de Montessus de Ballore, *Ibid.*, pp. 293-362.

foundation. As a consequence of the earthquake of 1905, many Calabrian towns must be largely rebuilt, and Professor Hobbs points out that it is of prime importance that in these cases a new site should be selected.

From such studies as these by Professor Hobbs, much light is thrown upon the principles of seismology, and facts are brought forth which ought to have a very high value, if intelligently studied and followed, in all earthquake-stricken regions. It is evident that a scientific study of earthquakes is capable of locating danger-lines in the crust, and it would seem the height of folly for people to rebuild on sites so evidently dangerous. The lesson taught is capable of much wider application than to Calabria alone. R. S. T.

GERMAN COLONIAL STUDIES.—Eighty papers were read before the German Colonial Congress of 1905. A short review of the published proceedings appears in the "Literaturbericht" of *Petermanns Mitteilungen* (No. 1, 1907). The volume contains 1,055 pages, and the contents are valuable not only for the study of the German colonies but also for the light thrown upon colonial problems in general. The first section deals with the geography, ethnology, and natural history of the colonies. The late Dr. Kirchhoff described the progress of geographical exploration and Dr. Weule the present condition of ethnological exploration. Among other papers in this section, Mr. Meinhof wrote on African languages and Mr. Strauch on the geographical nomenclature of the German South Sea Islands. The second section is devoted to tropical hygiene and tropical medicine, and the third to the judicial and political conditions in the colonies. Missionaries fill the fourth section with papers which seem to demonstrate that harmonious action between teachers of the Protestant and Catholic faiths is possible in the efforts to help the natives rise to a higher plane. The concluding three sections deal with the economic conditions, the question of emigration from the mother country to the colonies, and the industrial relations between Germany and these outer parts of the Empire.

This brief summary of the work of the Congress impressively illustrates the fact that an immense amount of energy and trained talent are being given to researches which, it is expected, will in time vastly increase the value of tropical lands to their inhabitants and to the world at large.

POLAR.

ANOTHER BRITISH ANTARCTIC EXPEDITION.—The London *Times* (weekly edition, Feb. 15) announces that a new British south polar expedition will leave England in October next under the command of Mr. E. H. Shackleton, who was third lieutenant of the ship *Discovery* during the National Antarctic expedition commanded by Captain Scott. Mr. Shackleton has organized the expedition, which will go to the winter quarters of the *Discovery* in latitude 77° 50′ S., Victoria Land. The explorers will be landed and the ship will return to New Zealand, and a year later will go back to take the explorers home. One of Mr. Shackleton's aims is to make the nearest approach to the south pole. It is asserted that Scott's southern sledge party would have reached a much higher altitude if it had been more adequately equipped for sledge work; and in the new expedition, in addition to dogs, Siberian ponies will be taken, as the surface of the land or ice over which they will have to travel is suited for this mode of sledging. A novel feature will be the use of a motor car which, in the opinion of some explorers, may be made available for ice and snow travel. A type of car suitable for this work is being constructed.

METEOROLOGY IN THE ANTARCTIC.—News has been received from Buenos Aires to the effect that the Argentine research ship *Uruguay* has returned from a perilous voyage to Scotia Bay, South Orkney Islands, whither she went to take a party under the leadership of Mr. Angus Rankin to relieve the members of the meteorological staff, who had spent more than a year on that desolate island, continuing the meteorological and magnetic work initiated in March, 1903, by the Scottish Antarctic expedition. On the voyage of the *Uruguay*, heavy pack ice and hundreds of icebergs were encountered, and the vessel sustained considerable damage.

Upon her return to South America, the *Uruguay* took on board another party of meteorologists, consisting largely of members of the former Ben Nevis Observatory staff, under the leadership of Mr. Bee, and left for Wandel Island, at the southern extremity of Gerlache Strait, on the west side of Graham Land, where a new meteorological and magnetic station will be established.

The station at South Georgia is also being continued, and it is planned to install other observing parties in the South Sandwich group and also on the west side of the Falklands. All this work is in the hands of the Argentine Republic, whose meteorological service is in the highest state of efficiency. This comprehensive scheme of work will be certain to advance knowledge of the meteorology and magnetism of the area lying to the south and east of Cape Horn.

CHAPTERS ON POLAR RESEARCH.—Three chapters on polar researeh in the "History of all Nations" seem to need revision. As examples of inaccurate or inadequate statements may be mentioned: The notice of the Arctic expedition of Captain John Ross, on which his nephew, James Ross, located the north magnetic pole, omits to mention that most conspicuous incident of the enterprise; Peary did not name the Smith Sound Eskimos "Arctic Highlanders;" Captain Sverdrup's expedition to the Arctic archipelago north of our continent indeed "contributed important scientific results," but the writer fails to say that his discoveries added several large islands to the archipelago; Nansen's "Farthest North" was not made by way of Franz Josef Land; that "a German expedition [*Gauss*] established a magnetic station on Kerguelen Island" is true, But the *Gauss* party wintered farther south and discovered Gauss Land, which is not mentioned; the Swedish expedition under Nordenskiöld did not lose its "vessels" in the ice, as it had only one vessel to lose; the work of the Scottish Antarctic expedition is mentioned, but not that it discovered new land; the Charcot expedition did not prove the connection of Bismarck Channel with the sea to the east.

WILKES LAND.—In a notice written by Prof. J. W. Gregory (*Nature*, No. 1940) of Vol. II of the scientific results of the German South Polar Expedition, devoted to the geological investigations of the party, the writer says that the "most striking geographical achievement of the expedition was its determination that Antarctica occurs farther north in western Wilkes Land than had been inferred by some authorities from the work of the Challenger. Prof. von Drygalski and his comrades have reëstablished faith in Wilkes's Termination Land, as from their Kaiser Wilhelm Land they saw high land to the northeast only about 100 miles from the site assigned by Wilkes to his Termination Land."

VARIOUS.

POPULATION OF THE LEADING STATES OF THE EARTH AND THEIR INCREASE IN TEN YEARS.—According to the latest official information, the increase of popula-

tion of the earth from 1895 to 1905 was about 63,000,000. The figures, in round numbers, of the leading countries are as follows:

	1895	1905
Russia	125,000,000	141,200,000
United States	68,934,000	83,143,000
Germany	52,279,000	60,605,000
Japan	42,271,000	47,975,000
Great Britain and Ireland	39,221,000	43,221,000
France	38,459,000	39,300,000
Italy	31,296,000	33,604,000
Austria	24,971,000	27,241,000
Hungary	18,257,000	20,114,000
Spain	18,157,000	18,900,900
Smaller Nations	47,732,000	54,166,000

Russia has the highest birth-rate with 49 per thousand, and also the highest death-rate with 31 per thousand. France, with 21 per thousand, has the lowest birth-rate, its death-rate being 19.6 per thousand, giving it the lowest increase in population. Spain, Italy, Austria, Hungary, and Japan have birth-rates of over 32 per thousand, but also high death-rates. The lowest death-rates among these powers is Japan, with 20; and the highest Spain, with 25.8 per thousand. Denmark shows the lowest death-rate, 13.9, and a birth-rate of 28.5 per thousand. England has a death-rate of 16.5 per thousand, but shows a decline in birth-rate to 27.6 per thousand. The population of great cities is given as follows:—London, 4,872,710; New York, 3,437,000; Paris, 2,714,000; Berlin, 2,040,000; Tokio, 1,819,000; Chicago, 1,699,000; Vienna, 1,675,000; Philadelphia, 1,294,000; St. Petersburg, 1,265,000; Moscow, 1,039,000; Buenos Aires, 1,026,000. (*British Blue Book.*)

The Journal of Geography completed its tenth volume with the number of December, 1906. Prof. R. E. Dodge, the editor and publisher, is to be congratulated upon the success of his efforts and those of his colleagues to establish a first-class educational periodical devoted to geography. The *Journal of Geography* has not appeared during the entire ten years under its present title, but the scope and character of the publication have been consistently preserved.

Dr. Emil Philippi, private docent in the University of Berlin and geologist in the Drygalski south polar expedition, has accepted a call to the Häckel professorship of geology and palæontology in the University of Jena.

The German Colonial Society has appropriated 3,000 marks to pay the expenses of the cartographer Paul Sprigade on a journey to Togo to make cartographic studies, in case this sum is not paid from the Imperial Treasury. His colleague Max Moisel will go to the Cameroons for a similar purpose at the cost of the Colonial Office and the Cameroons Government.

The same Society has voted the sum of 3,000 marks to missionary Jacob Spieth, to pay the cost of producing his work "Die Ewe Stämme," which Professor Luschan says is invaluable, not only for its scientific interest, but also for the good use that may be made of it in the material development of the Protectorate.

The *Boletin* of the Board of Public Works, Mexico (No. 5, 1906), is chiefly given to a description of the rebuilt railroad across the Isthmus of Tehuantepec,

the country through which it runs, and the commercial advantages which it offers to the nations. A large number of photographs give aspects of the country and settlements along the railroad, and there are panoramas of the terminal seaports.

CAPTAIN AMUNDSEN, the Norwegian explorer, who recently sailed through the Northwest Passage in the *Gjöa,* has lectured before several Paris scientific societies and has been made commander of the Legion of Honor. Captain Amundsen expects to visit the United States in the autumn.

DR. GEORG SCHWEINFURTH celebrated his seventieth birthday a few weeks ago. Contemporaneous with some of the great pioneers in the modern exploration of Africa, he is one of the very few who are still alive. The work that first gave him enduring reputation was begun in 1869, when he explored the countries west of the upper White Nile, discovered the Akka dwarfs, and described the large tribes of the Niam Niam and the Monbuttu. In recent years he has made extended researches relating to Egyptian botany and archæology.

In The Life of Sir Charles J. F. Bunbury, Bart., just published by John Murray, the late naturalist relates many incidents of his intercourse with distinguished men during his long life. He gives in the second volume some account of his meetings with Humboldt, of whom he writes:

> He is a delightful old man, with all the courtesy and polish of an old Frenchman, and with a vivacity and activity of mind that are perfectly wonderful in a man of eighty-five. He is a little bent, but still hale and fresh looking . . . He has all the volubility of speech that I have so often heard of, but you may well suppose I was quite willing to listen and did not wish to say much. . . . What is particularly striking is his eager interest in all that is going on in all the world of science, his acquaintance with all the newest researches, and his constant desire for fresh information.

SIR F. LUGARD, in his recent report on northern Nigeria, says that his efforts to introduce the plough have thus far proved unsuccessful. He is now introducing among the natives a few simple tools, such as adzes, pickaxes, hammers, and saws, in the hope that they may become popular and create a demand.

The Government of the Gold Coast Colony (British) has made provision for a loan of over $6,000,000 to complete the Sekondi-Kumasi and Accra railroads and to build harbour works at Accra and Sekondi.

THE SIXTEENTH SESSION of the German Geographical Congress will be held in Nuremberg on May 21-25. The papers and discussions will be distributed in the following sections: 1, History of Geography; 2, Geography of North Bavaria; 3, Anthropogeography, with Historical Geography; 4, The Study of Lakes and Rivers; 5, Geographical Instruction.

THE AMERICAN GEOGRAPHICAL SOCIETY. A Regular Meeting was held at Mendelssohn Hall, No. 119 West Fortieth Street, on Tuesday, March 26, 1907, at 8.30 o'clock P. M.

President Huntington in the chair.

The following persons, recommended by the Council, were elected Fellows:

Charles C. Whinery, Richard Mortimer.

The President then introduced Mr. Edward S. Curtis, who addressed the Society on The Indian: His Races and His Lands.

Stereopticon views were shown.

On motion, the Society adjourned.

OBITUARY.

COUNT ZICHY.—Count Eugen Zichy von Vasonykeö, born in July, 1837, at Mihaly, Hungary, died in December last. He made journeys to Central Asia, partly to establish, if possible, the position of the original home of the Huns. In 1895-96, he visited the Caucasus and Central Asia, and travelled also in the same regions in 1897-99. His first journey was described in a book "Voyages au Caucase et en Asie centrale" (1897). His later travels were especially rich in various scientific results, which began to appear in book form in 1900 under the title "Dritte asiatische Forschungsreise des Grafen Eugen Zichy" (German and Hungarian). Several scientific collaborators assisted him in the preparation of a number of volumes of this work which have not yet been published. It is hoped that arrangements to bring them out have been made.

H. C. RUSSELL.—The death of H. C. Russell, Government Astronomer of New South Wales, is announced. He was seventy-one years old and had served New South Wales in that position since 1870. His geographical interests, also, were considerable. His studies threw light on the problem of Lake George in New South Wales, which at one time is a widespread sheet of water teeming with fish and then, during a period of desiccation its waters are evaporated and crops are raised on the lake floor. The colony was greatly indebted to him for his organization of the meteorological service, his labours in this field having contributed to its prosperity.

DR. ALFRED KIRCHHOFF.—Dr. Kirchhoff, Emeritus Professor of Geography in the University of Halle, died on Feb. 8, aged 68 years. He studied natural history in Jena and Bonn (1858-61), and, after years of work in the school room, became professor in the University of Halle in 1873. He retired from active educational life in 1904 to his home at Mockau, near Leipzig. He was a prolific writer, and his literary as well as his professional work established his place among leading geographers. Many editions of his text-books have been used in German schools. The interaction between geographical environment and organic and inorganic forms of life was one of his favourite subjects. His book *Mensch und Erde* was issued in an excellent English edition (E. P. Dutton & Co., New York) in 1906.

NEW MAPS.

AFRICA.

AFRICA.—Diagram to Illustrate the Progress of the Delimitation of British Frontiers in Africa. Scale, 450 miles to an inch. *Colonial Reports,* No. 500, London, 1906.

Shows in red the condition of the British frontiers in Africa to August 1906. The frontier lines that have been marked and ratified are distinguished from those which have only been surveyed, or have not yet been surveyed.

SAHARA.—Région de Beni-Abbès. Scale, 1:50,000, or 0.7 statute mile to an inch. By Captain Bérenger. *Bulletin Trimestriel* of the Geographical and Archæological Society of Oran, Dec., 1906.

SAHARA.—Région de Beni-Abbès. Scale, 1:50,000, or 0.7 statute mile to an inch. Same author and publication as above.

These two maps illustrate a long paper by Captain Bérenger on this region in the eastern part of the Algerian Sahara. This oasis, on the border of the Great Erg, was occupied by French troops in 1901, and Captain Bérenger lived at the post for a year, and has written a very careful paper on its geology, geography, resources, population, and industries. His maps are black-and-white sketches. The first shows the topography, wells, routes, and fossiliferous beds for a wide district around Beni-Abbès from Igli in the north to the south of Wargla. The second is a more detailed map of the oasis and its immediate environs, showing the distribution of date-palm planting and irrigation canals, the dunes of the neighbouring Great Erg on the north-east and the border of the Hamada in the south-west.

NORTHERN NIGERIA.—Parts of the Provinces of Kabba and Bassa. Scale, 1:500,000, or 7.89 statute miles to an inch. From compass and plane table surveys by D. Cator (1904-6). *The Geog. Jour.*, March, 1907.

The lower Niger, between Ida and the junction of the Niger and Benue, divides these provinces. A good sketch map with many place-names, routes, and streams.

AMERICA.

U. S. HYDROGRAPHIC CHARTS.

Pilot Chart of the North Atlantic Ocean, March, 1907.
Pilot Chart of the North Pacific Ocean, April, 1907.

NORTH CAROLINA.—Map of North Carolina showing the distribution of Iron Ores. Scale, 1:267,200, or 20 statute miles to an inch. (In pocket.) The North Carolina Geological Survey, Raleigh, 1892.

This map of the distribution of iron ores in North Carolina was the result of the field work of H. B. C. Nitze in 1891 and 1892. The ores occur mainly in the older crystalline schists. The map illustrates *Bulletin* 1 of this Survey.

NORTH CAROLINA.—Physiographic Map of North Carolina. In *Bulletin* 2 of the North Carolina Geological Survey, Raleigh, 1906.

NORTH CAROLINA.—Map showing geographical distribution in North Carolina of Granite and Gneiss. *Bulletin* 2 as above.

NORTH CAROLINA.—Map of western portion of North Carolina showing distribution of Marble Beds. *Bulletin* 2 as above.

NORTH CAROLINA.—Map of Central Portion of North Carolina showing Distribution of the Triassic Sandstone. *Bulletin* 2 as above.

These four maps, printed without scales, illustrate a monograph on the building and ornamental stones of North Carolina by Thomas L. Watson and Francis B. Laney, with the collaboration of George P. Merrill. In preparing the maps, the resources of the U. S. Geological Survey were drawn upon whenever possible. The evidence shows the State to be well supplied with a great variety of building stone materials, particularly those of a granitic type.

CANADA.—Province of Nova Scotia. Scale, 1:63,360, or one statute mile to an inch. Sheets 59, 60, 61, 62, 63, 64, 65, 74, 75, 76, 82, 83. Geological Survey of Canada, Ottawa, 1905. (Price, 10c. a sheet.)

These are geological sheets. Colours are used to show geological formations.

Roads, railroads, streams, and places are in black. The scale permits a large amount of this detail. The coast-lines are based upon triangulation, but many positions in the interior depend upon less exact data, as chain, odometer, and pace surveys. The maps are not topographic except as relates to the drainage. The bases upon which to impose the geological information are therefore not so exact as those supplied in our geologic folios. Every sheet, however, gives the nature of the sources of information and, as relates to the geology, references to the literature covering the geology of that sheet. Heights are given in feet above sea-level, the position of commercial minerals and metals is shown, and the approximate magnetic declination appears on each sheet.

BAFFIN BAY.—Karte der Meeresströmungen im Bereich der Baffin-Bai. 1:12,000,000, or 189.3 statute miles to an inch. Veröffentlichungen des Instituts für Meereskunde und des Geographischen Instituts an der Universität Berlin. Heft 7, 1906.

Illustrates the monograph by Dr. Ludwig Mecking on "Die Eistrift aus dem Bereich der Baffin-Bai beherrscht von Strom und Wetter," to which this number is devoted. All the observed currents from Robeson Channel to the Gulf of St. Lawrence and from Banks Land to the East Greenland Sea are shown by arrows in blue.

ASIA.

CHINA.—(1) Sketch Map to Illustrate Notes on the Liao River System and Rivers rising in Wei-Ch'ang. Scale, 1:3,000,000, or 47.35 statute miles to an inch. *The Geog. Jour.*, London, March, 1907.

CHINA.—(2) Sketch Map of Part of Outer Chih-li. Showing Limits of Wei-ch'ang or Imperial Hunting Ground and the Upper Courses of the Lan, Pai, Ying-ch'ing and Huang Rivers. Scale, 1:1,500,000, or 23.67 statute miles to an inch. *The Geog. Jour.*, March, 1907.

CHINA.—(3) Routes and rivers in An-hui and parts of adjacent provinces. Scale, 1:1,000,000, or 15.78 statute miles to an inch. *The Geog. Jour.*, March, 1907.

These maps illustrate a paper by Lieut.-Colonel A. W. S. Wingate on "Nine Years' Survey and Exploration in Northern and Central China." The first two are black-and-white sketches. No. 3 is a map in colours—black for names, telegraphs and railroads, blue for hydrography, and red for exploration and survey routes. It is based upon plane-table surveys and sketches. The route surveys on this sheet are adjusted to the recent Admiralty positions of Wu-hu and Hankow. These maps supply considerable material for the improvement of atlas sheets.

EUROPE.

TURKEY.—Adrianople. Scale, 1:250,000, or 3.95 statute miles to an inch. Published by the Topographical Section, General Staff, British War Office. Selling Agents, Edward Stanford, London, 1906. (Price, 2s 6d.)

This is the second sheet of a map of Turkey which is now being issued by the Topographical Section of the British War Office. The first sheet to appear was that of the Constantinople region, to the south-east of the area covered by the present sheet. It is said to be the intention to map the whole of Turkey on this comparatively large scale, and it is to be hoped that this will be done. Elevations are shown by approximate contours with vertical interval of 100 feet. Contours

are in brown, forest areas in green, drainage and stream names in blue, other names and most of the roads in black, and the main highways in brown. The English equivalents for many Turkish geographical expressions are given. This is the latest contribution to the mapping of Turkey, and it is probably correct to say that it excels any other map of the same region in the amount of information it gives.

GENERAL.

INDIAN OCEAN.—The Central Islands of the Seychelles Group. Scale, 1:250,000, or 3.94 statute miles to an inch. With an inset of the Seychelles and Amirante Groups on a scale of 110.47 statute miles to an inch. *The Geog. Jour.*, London, Feb., 1907.

The map in colours includes all the more important islands of the Seychelles Group on a scale large enough to give an excellent idea of their topography, the coral reef, and the surrounding seas. The indication of the sea-floor contours is especially informing, four tints of blue representing areas of 10, 20, 30 and over 30 fathoms, besides which many soundings are given. The quality of the sea-floor (coral, globigerina, etc.) is indicated. The map illustrates a paper on the Seychelles Archipelago by J. Stanley Gardiner.

INDIAN OCEAN.—Scale 1:7,000,000, or 110.47 statute miles to an inch. *The Geog. Jour.*, London, Oct., 1906.

This chart illustrates a paper on The Indian Ocean by J. Stanley Gardiner, and is noteworthy as based chiefly upon numerous soundings by the Percy Sladen Expedition, 1905, in the Indian Ocean, and especially in the neighbourhood of the Chagos, Seychelles, Farquhar and Amirante Groups, the Saya de Malha and Nazareth Banks, and also a line across the ocean near the 20th parallel, S. Lat. Soundings are expressed in fathoms and the various qualities of the bottom are indicated.

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JANUARY–MARCH, 1907.

AFRICA.

CORDIER, HENRI.—Le Périple d'Afrique. Du Cap au Zambèse et à l'Océan Indien. (Illustrations.) Paris, E. Guilmoto. [1906.] 8vo.

[EGYPT.] BALFOUR, ANDREW.—Second Report of the Wellcome Research Laboratories at the Gordon Memorial College, Khartoum. (Map and Illustrations.) Khartoum, Dep't of Education, Sudan Government. 1906. 4to. [*Gift from the Author, Director of the Wellcome Research Laboratories.*]

EGYPT EXPLORATION FUND.—Temple of Deir El Bahari. By Edouard Naville. Part V: Plates CXIX-CL. The Upper Court and Sanctuary. London, Egypt Ex. Fund. 1906. Folio.

JOHNSON, W. S.—Orangia. A Geographical Reader of the Orange River Colony. [Map and Illustrations.] London, Longmans, Green & Co. 1906. 16mo. [*Gift.*]

SANDERSON, EDGAR.—Great Britain in Modern Africa. With Portraits (and Map). London, Seeley & Co. 1907. 8vo. [*Gift.*]

SCHOEFFER, REV. FATHER.—Grammar of the Bemba Language as spoken in North-East Rhodesia. Edited by J. H. West Sheane . . . Arranged, with Preface, by A. C. Madan. Oxford, Clarendon Press. 1907. 16mo.

SEIDEL, A.—Die Haussasprache. Hausa-German-French-English. Heidelberg, Julius Groos. 1906. 16mo. [*Gift.*]

VELTEN, C.—Prosa und Poesie der Suaheli. Berlin, C. Velten. 1907. 8vo. [*Gift from the Author.*]

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ABBOT, HENRY L.—Problems of the Panama Canal, including . . . Discussion of Plans for the Waterway, with History from 1890 to date. (Map and Illustrations.) New York, The Macmillan Co. 1907. 8vo. [*Gift.*]

ACOSTA, JOSEPH DE.—Historia Natural y Moral de las Indias . . . Publicada en Sevilla en 1590. y ahora fielmente reimpresa de la primera edición, Madrid, (Ramón Anglés). 1894. 2 vols. 16mo.

ADAMS, CHARLES F.—Lee's Centennial: An Address delivered at Lexington, Virginia, Saturday, January 19, 1907, on the invitation of the President and Faculty of Washington and Lee University. s. l. [1907.] pr., 8vo. [*Gift from the Author.*]

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BAEDEKER, KARL.—Dominion of Canada, with Newfoundland and an Excursion to Alaska. Handbook for Travellers. 13 maps and 12 plans. 3rd revised and augmented edition. Leipzig, K. Baedeker. 1907. 16mo. [*Gift.*]

BANCROFT, HUBERT HOWE.—Some Cities and San Francisco and Resurgam. New York, The Bancroft Co. 1907. 16mo. [*Gift.*]

BRAZ DA COSTA RUBIM.—Vocabulario Brasileiro para servir de complemento aos diccionarios da lingua portugueza. Rio de Janeiro, Paula Brito. 1853. 8vo.

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CHAMPLAIN, SAMUEL DE, The Voyages and Explorations of. (1604–1616.) Narrated by Himself. Translated by Annie Nettleton Bourne. Together with The Voyage of 1603, reprinted from Purchas His Pilgrimes. Edited, with Introduction and Notes, by Edward Gaylord Bourne. Illustrated. New York, A. S. Barnes & Co. 1906. 2 vols. 16mo. [*Gift.*]

CURTIS, M. A.—Geological and Natural History Survey of North-Carolina, Part III., Botany: containing a Catalogue of the Plants of the State, with Descriptions . . . etc. By Rev.——, D. D. Raleigh, W. W. Holden, Printer to the State. 1860. pr., 8vo.

DISOSWAY, GABRIEL P.—The Earliest Churches of New York and Its Vicinity. [Eleven Plates.] New York, James G. Gregory. 1865. 8vo.

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STEPHAN, CHARLES H.—Le Guatemala Economique. Renseignements Pratiques et Utiles à l'usage des Industriels, Transporteurs, Capitalistes, &c. Paris, Chevalier & Rivière. 1907. 8vo.

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BROOMHALL, MARSHALL.—Pioneer Work in Hunan by Adam Dorward and Other Missionaries of the China Inland Mission. Portraits, illustrations and map. London, Morgan and Scott. 1906. 16mo. [*Gift.*]

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M'CRINDLE, J. W.—Ancient India as described in Classical Literature. Being a Collection of Greek and Latin Texts relating to India . . . translated and copiously annotated by ———. Westminster, A. Constable & Co. 1901. 8vo.

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REYNOLDS-BALL, EUSTACE.—The Tourist's India. Illustrations and Map. London, Swan Sonnenschein & Co., 1907. 8vo. [*Gift.*]

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ATLAS, THE LARGE ENGLISH, or a New Set of Maps of all the Counties in England and Wales, etc., etc. By Emanuel Bowen, Thomas Kitchen and Others. London, Robert Sayer (1750?) folio.

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CANADA, GEOLOGICAL MAPS.—*Scale* 1 inch=1 mile. 12 sheets of the Survey, each 18½ x 12¾ inches. Printed in colours. [Ottawa.] Geological Survey of Canada. 1905. [*Gift.*]

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[CHINA.] PROVINCE OF CHIH-LI.—(Southern Sheet.) *Scale*, 1:1,000,000. *Size*, 28 x 22 inches. Compiled in the Topographical Section, General Staff, 1906. Reproduced and printed at the Ordnance Survey Office, Southampton. [*Gift.*]

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ENGLAND AND WALES.—Ordnance Survey. Third Edition. *Scale*, 1 inch=1 mile. 15 Sheets. Average size of each sheet 18 x 22 inches. Printed in colours. Southampton, Ordnance Survey Dep't. 1906.

GREAT BRITAIN AND IRELAND, Collection of Maps, 1852–1859, by Wyld and

Cassell, including Cassell's map of London and Environs in 13 sheets. Bound in folio volume. [*Gift of Norman W. Browne, New York.*]

NEW YORK, MAP OF THE CITY OF, extending Northward to Fiftieth St. Surveyed and Drawn by John F. Harrison, C.E. Publd. by M. Dripps, N. Y., 1852. Engraved and printed at Kollner's Lithographic Establishment, Phila. *Scale*, 300 feet=1 inch. *Size*, 48 x 91 inches. [18 views of public buildings in the border.] Mounted on cloth, dissected to fold. [*Gift from Norman W. Browne, New York.*]

NEW YORK STATE.—Road Map, showing proposed system of improved Highways, pursuant to Chap. 115, Laws of 1898. Accompanying the Annual Report of Henry A. Van Alstyne, State Engineer and Surveyor. *Scale*, 9 miles=1 inch. *Size*, 37½ x 32½ inches. With Inset, Southern Part of New York and Long Island. *Scale*, 5 miles=1 inch. Albany, Brandow Printing Co. 1906. [*Gift from Chandler Robbins, New York.*]

[NORWAY, SOUTHERN,] GENERALKART OVER DET SYDLIGE NORGE. *Scale*, 1:400,000. Sheet XV, *size* 17 x 14¾ inches. Kristiania, Norges geografiske Opmaaling. 1906. [*Gift.*]

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lore and Popular Religion of the Malay Peninsula. With Preface by Charles Otto Blagden. (Illustrations.) London, Macmillan & Co. 1900. 8vo.

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ZEITSCHRIFT DES DEUTSCHEN UND ÖSTERREICHISCHEN ALPENVEREINS.—Band 37, 1906. [Maps and Plates.] Innsbruck, Verlag des D. und O. Alpenvereins. 8vo.

BOOK NOTICES.

Persia Past and Present. A Book of Travel and Research. By A. V. Williams Jackson. xxxi and 471 pp., more than 200 Illustrations, Index and Map. The Macmillan Company, New York, 1906.

Leave of absence from Columbia University for half a year enabled Professor Jackson to make the eastern trip which forms the subject of this entertaining and scholarly volume. His route carried him from the Caucasus on the north nearly to the Persian Gulf on the south; thence to Yezd in the central desert and back northward to Teheran and the Caspian Sea. The journey across the Caspian and from there on into the heart of Asia is reserved for treatment in a second volume. The purpose of the trip, as the author tells us, was "antiquarian study and scholarly research, especially with regard to Zoroaster and the ancient faith of the Magi," with the intent also of "contributing something to our knowledge of Persia's present as well as her past and to a better understanding of the relation existing between them." Perhaps no better tribute can be paid to the book than to say that its purpose is a true description of its content.

The general plan of the book is to relate things chronologically as they happened on the trip. The reader thus follows the traveller on his caravan journey, hears of the difficulties and adventures encountered, becomes acquainted with the aspect of the country and with the people and their customs. The principal features of each town are described and each is shown in relation to its past, surrounded with a wealth of historic associations such as only a scholarly mind could lend. Technical points are discussed as they are met and new light is

thrown upon them. The book is splendidly illustrated with half-tone reproductions.

A general description is given of the topography and climatic conditions of Persia; its dearth of rivers and the consequent necessity for artificial irrigation. It is interestingly pointed out that "irrigation was synonymous with righteousness in the old Zoroastrian religion, and agriculture a religious duty." Present methods of tillage are noted, and it is suggested that the primitiveness of the implements now in use offers a fertile field for export trade from the United States.

The chief events of Persia's political and religious history are sketched; her place among ancient nations, and the influence of the language and literature upon the literature of other countries. An outline of the life of Zoroaster and the history of Zoroastrianism follows, with mention especially of the successive shocks the religion received from foreign wars and invasions, the final blow coming from Islam in the 7th Century; for from this moment Persia practically adopted Mohammedanism. Two bands only remained faithful to their old religion; one took refuge in Bombay and its vicinity, thus becoming the ancestors of the present Parsis; the other, remaining in Persia, and undergoing all kinds of persecution, finally congregated in the desert city of Yezd, where it is said to number between 8,000 and 8,500. The author tells entertainingly of his reception in this community and of the conference held with the Acting High Priest and other leaders of their faith. For three hours and more Professor Jackson asked and answered questions. Two complete manuscripts of the Avesta and some fragments were shown him. The meaning of Zoroaster's name, disputed points in his life and questions of philosophy were discussed. Professor Jackson was able to tell them what none of them knew—that a large part of the Younger Avesta is composed in metre. Several days were spent in this city, observing the religious customs of these Zoroastrians, their worship in the fire temple, their marriage and funeral rites, and religious initiations.

Most interesting is the author's account of his study of the cuneiform inscriptions on the Behistan rock—inscriptions made by the Kings Cyrus, Darius, Xerxes and Artaxerxes—chronicling the most important events in their reigns (B. C. 541-340). Although the existence of these inscriptions had been known from times of antiquity, nothing was known of their meaning until 1802, when the key to cuneiform characters was discovered by the brilliant German schoolmaster and philologist, Grotefend. To Sir Henry Rawlinson belongs the honour of first making the difficult and dangerous ascent to the top of the Behistan Rock, copying the inscriptions and interpreting them with this key. No one since Rawlinson had examined the inscriptions at first hand; and one of the main purposes of Professor Jackson's trip was accomplished when he made the ascent and could testify to the wonderful accuracy of Rawlinson's work. The reading and corrections he was able to make, and one photograph taken, are here printed, together with critical comments, which are of the utmost interest and importance to the antiquarian.

On reaching the plain once more, the author took opportunity to "urge the inhabitants of Bisitun charily to guard their inscriptions and to tell them of the divine blessings which King Darius invoked upon all such as do so and of the curses that are assured if it were injured."

Prof. Jackson questions the accuracy of identifying Tabriz with the ancient Gaza or Ganzaca, and does not feel sure even that it was formerly called Shahistan (King's-town). He agrees with Rawlinson in thinking that Takht-i

Suleiman is the same as the ancient Shiz; but he disputes the truth of identifying Gazaca, Ganzaca or Ganzog with Shiz, and consequently with the modern Takht-i Suleiman.

In a note, statements are collected from a Perso-Arabic geographer to the effect that an old name for Yezd, or for the main quarter of the city, was "Kata." There is good reason, Professor Jackson thinks, for holding this to be true, although there is some dissenting opinion.

Two old itineraries from Shiraz to Yezd are quoted in full: the one by Istakhri, in the 10th Century; the other by Josafa Barbaro, in the 15th Century.

The author is by no means a "dry-as-dust" antiquarian. He has a keen sense of humour, a broad appreciation of beauty and literary knowledge and feeling. One enjoys such touches as "It was Shakspere's birthday—a day memorable to me even in Persia." These personal qualities, combined with scholarliness of treatment, have produced a rare book, and make welcome the news that Professor Jackson will start in April for another trip to the Orient. J. B. A.

The Dominion of Canada, with Newfoundland and an Excursion to Alaska. Handbook for Travellers, by Karl Baedeker. Third revised and augmented edition. lxiv and 331 pp., Bibliography, 13 Maps, 12 Plans, and Index. Karl Baedeker, Leipzig, and Charles Scribner's Sons, New York, 1907. (Price, $1.80.)

Northern Italy, including Leghorn, Florence, Ravenna, and Routes through Switzerland and Austria. By Karl Baedeker. Thirteenth Remodelled Edition. lxiv and 592 pp., 30 Maps, 40 Plans, and a Panorama. Karl Baedeker, Leipzig, and Charles Scribner's Sons, New York, 1906. (Price, $2.40.)

The present edition of Baedeker's "Canada" is especially welcome because so much has been done recently, particularly among the Canadian Cordilleras, to enhance the enjoyment of tourists. This edition is thoroughly up to date and no compendium of Canada for the use of travellers equals this volume. The special sections are written by the men who are qualified to make them most valuable. The late Dr. George M. Dawson's geographical and geological sketch of Canada has been revised by Dr. H. M. Ami and Mr. James White, and those who know the scientific personnel of Canada are aware of the thorough qualifications of Ami and White for such literary service. The maps, as usual, are admirable. One of the new maps is that of the Selkirk Range, to which the tide of travel is increasing every year. This is based upon the surveys of Arthur O. Wheeler, who wrote the authoritative book on the Selkirks, printed by the Canadian Government in 1905. Sixteen pages are given to the Alaska trip from Victoria to Sitka and the Yukon.

The present volume of North Italy has been revised and considerably augmented. It is a well-arranged and complete introduction to the routes, the culture, and the art of one of the most fascinating parts of Europe.

Arctic Exploration. By J. Douglas Hoare. viii and 314 pp., 4 Maps, 18 Illustrations, and Index. E. P. Dutton & Co., New York, 1906.

This book is a summary in considerable detail of Arctic explorations. It does not cover the whole list, but chapters are devoted to all the conspicuous expeditions, and they are treated at sufficient length to give them the character of narrations of Arctic work instead of mere résumés. The result is that the book

has readable quality, and is well adapted to impart a comprehensive view of Arctic exploration. The facts are accurate, and the maps are excellent, especially the Bartholomew chart of the north polar regions. The history of Arctic enterprise is brought down to Peary's last expedition.

Erdkunde für Schulen. Von Alfred Kirchhoff. I Teil: Unterstufe. Thirteenth improved edition. 66 pp., 12 Illustrations. Buchhandlung des Waisenhauses, Halle a. S., 1906. (Price, 80 pf.)

Erdkunde für Schulen. Von Alfred Kirchhoff. II Teil: Mittel- und Oberstufe. Thirteenth edition. v and 395 pp., 36 Illustrations, 1 Table, and Index. Buchhandlung des Waisenhauses, Halle a S., 1997. (Price, M. 3.40.)

Part I gives the outlines of mathematical and political geography and globe studies for beginners. Part II is regarded as among the best geographies used in German schools. Written for the middle and high schools, it practically covers the field of geography as far as the study is pursued by students for whom it is intended. The section on map projections will be valuable to any American student who reads German. Germany and her colonies are treated with particular fulness. There are no maps in the text nor any references to maps in the footnotes, which means that the books are to be used in connection with any of the good German school atlases.

Hunting Big Game with Gun and with Kodak. A Record of Personal Experiences in the United States, Canada, and Mexico. By William S. Thomas. ix and 240 pp., 70 Illustrations from original photographs, and Index. G. P. Putnam's Sons, New York and London, 1906.

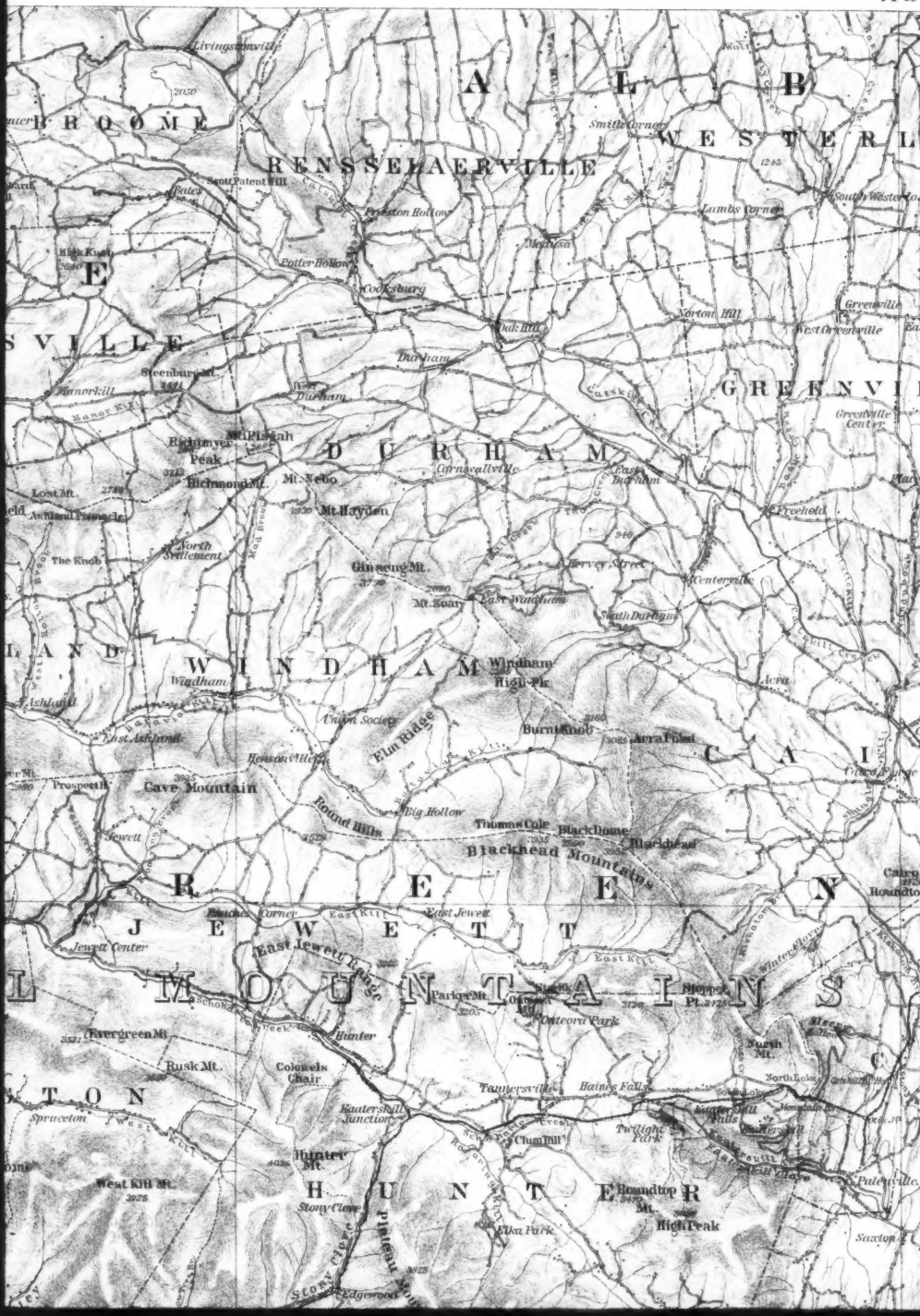
These hunting adventures are widely distributed from British Columbia to New Brunswick and south to Mexico. They are lively sketches of the wilds that will interest a far larger circle than the brotherhood of Nimrods. The kodak had a conspicuous place in these outings and nearly every page has a half-tone illustration. More of these good views should bear titles giving an idea of their location. This would help to increase the geographical interest of the book. Much of the information concerns the life led by Indians, hunters, and trappers. The author was so fortunate as to catch on his photographic plates many specimens of deer, moose, water birds, and other animals in superb settings of lakes, forests, and mountains.

Pioneer Work in Hunan by Adam Dorward and other Missionaries of the China Inland Mission. By Marshall Broomhall. viii and 114 pp., Two Appendices, Illustrations, Map, and Index. China Inland Mission, 1906. (Price, 2s.)

Pioneer missionaries were long knocking at the door of Hunan and they laboured there for many years without fruit to cheer them. This narrative of missionary effort has great variety, for the story leads through the years of the closed doors into the present era with its boundless opportunities. Modern Chinese history would not be complete without such chapters as this volume supplies. The book contains an alphabetical list of all the chief, walled cities of Hunan. A map of the country, on which is imposed a map of England and Wales, shows that Hunan is considerably larger than that part of Great Britain.

74°45'
74°30'
42°30'
42°15'
JEFFERSON
BLENHEIM
SCHOHARIE
HARPERSFIELD
KORTRIGHT
STAMFORD
ROXBURY
BOVINA
DELAWARE
CATSKILL
HALCOTT
ANDES
MIDDLETOWN
North Harpersfield
Jefferson
Granby B.
Maple Hill
Prospect Hill
Potter Hill
Harpersfield
Stamford Reservoir
Mine Hill
South Jefferson
Bald Hill
Oakell Lakes
Stamford
Oak Hill
Pachyn Hill
Ettsavantha Mt.
Churchill Mtn.
West Brook
Kortright
McGregor Mt.
Moresville Ridge
Pine Mountain
Town Brook
South Kortright
Brisk Mt.
Mine Settlement
Relay
Gray Hill
Old Clump Hill
Hubbell Corners
Bloomberg Mt.
Roundtop
West Settlement
Roxbury
Rock Flats
Bovina
Bovina Center
Plattekill Mt.
Red Mt.
Bearpen Mt.
Cates Roundtop
Vega
Mt. Pisgah
New Kingston
Denver
Halcottsville
Halcott Center
Keiths Corners
Prattsville Hollow
Prattsville Hollow
Prattsville
Middletown
Middletown Hollow
Middletown Hollow
Bridle Hill
Margaretville
Arkville
Fleischmanns
Fleischmanns Mt.
Dunraven
Pataskala Mtn.
Quinney Corners
Summit Mt.
Dutchmount
Vly Mt.
Granite Hollow
Granite Hollow
Granite Hollow

74°15'
BROOME
RENSSELAERVILLE
CONESVILLE
DURHAM
ASHLAND
WINDHAM
GREENE
JEWETT
SKILL MOUNTAIN
LEXINGTON
HUNTER
Saffordville
Broome Center
Lockard Hill
Scott Patent Hill
Potter Hollow
Coxsburg
Flat Creek
High Knob
Darling Hill
Reed Hill
Rocky Rock
Gilboa
Stevens Mt.
Conesville
Manorkill
Steenburgh Mt.
Durham
West Conesville
Pine Mountain
Hardscrabble Mt.
Mt. Pisgah
Mt. Neeo
Carnesville
Lost Mt.
Richmond Mt.
Ashland Pinnacle
Hunterfield Mt.
Mt. Hayden
The Knob
North Settlement
Ginseng Mt.
Mt. Zoar
Richmond Corners
Prattsville
Red Falls
Ashland
Windham
Union Society
Elm Ridge
Patterson Ridge
Tower Mt.
Prospect
Cave Mountain
Jewett
Round Hills
Big Hollow
Vly Mt.
Vinegar Hill Inn
Lexington
Jewett Center
East Jewett Ridge
Parker Mt.
West Kill
Evergreen Mt.
Hunter
Deep Notch
Rusk Mt.
Colonels Chair
Balsam Mt.
Spruceton
Kaaterskill Junction
Balcutt Mt.
North Bound
West Kill Mt.
Hunter Mt.
Stony Clove
Bushnellsville
Rose Mt.
Pinnacle Mt.
Edgewood


74°15'
74°00'
R E N S S E L A E R V I L L E
D U R H A M
W I N D H A M
H U N T E R
M O U N T A I N S
Livingstonville
Scott Patent Hill
Potter Hollow
Cockburn
Durham
East Durham
Carnwallville
Mt. Nebo
Mt. Hayden
Richmondville
Mt. Pisgah
Steenburgh
Manorkill
Ginseng Mt.
Mt. Zoar
East Windham
Windham
Windham High Pk.
Union Society
Elm Ridge
Burnt Knob
Cave Mountain
Round Hills
Big Hollow
Thomas Cole
Blackdome
Blackhead
Blackhead Mountains
East Jewett
Jewett Center
East Jewett Bridge
Parker Pt.
Evergreen Mt.
Hunter
Rusk Mt.
Colonels Chair
Spruceton
Kaaterskill Junction
Tannersville
Bearpen Mt.
Stony Clove
Elka Park
Edgewood
Pisgah Mountain
Roundtop Mt.
High Peak
Twilight Park
Chum Hill
Haines Falls
Palenville
Saxton
Greenville
West Greenville
Greenville Center
Norton Hill
Oak Hill
Greenfield
Freehold
Jervey Street
Centerville
South Durham
Acra
Acra Point
Prospect Mt.
Ashland
East Ashland
Ashland Pinnacle
Lost Mt.
Richmondville
The Knob
North Settlement
Meadosa
Lamtis Corners
Smith Corners
Potter
Preston Hollow
High Knob
Manorkill
Durham
Greenville
Jewett
Hunter
Parker Pt.
Blackhead
Blackhead Mountains
Thomas Cole
Blackdome
Round Hills
Big Hollow
Cave Mountain
Elm Ridge
Burnt Knob
Windham
Windham High Pk.
Ginseng Mt.
Mt. Zoar
Mt. Hayden
Mt. Nebo
Richmondville
Durham
Carnwallville
East Durham
Greenville
Freehold
Acra
Ashland
East Ashland
Prospect Mt.
Lost Mt.
Ashland Pinnacle
The Knob
North Settlement
Evergreen Mt.
Rusk Mt.
Colonels Chair
Spruceton
Kaaterskill Junction
Tannersville
Haines Falls
Twilight Park
Chum Hill
Hunter Mt.
West Kill Mt.
Stony Clove
Elka Park
Edgewood
Pisgah Mountain
Roundtop Mt.
High Peak
Palenville
Saxton
Greenville
West Greenville
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Oak Hill
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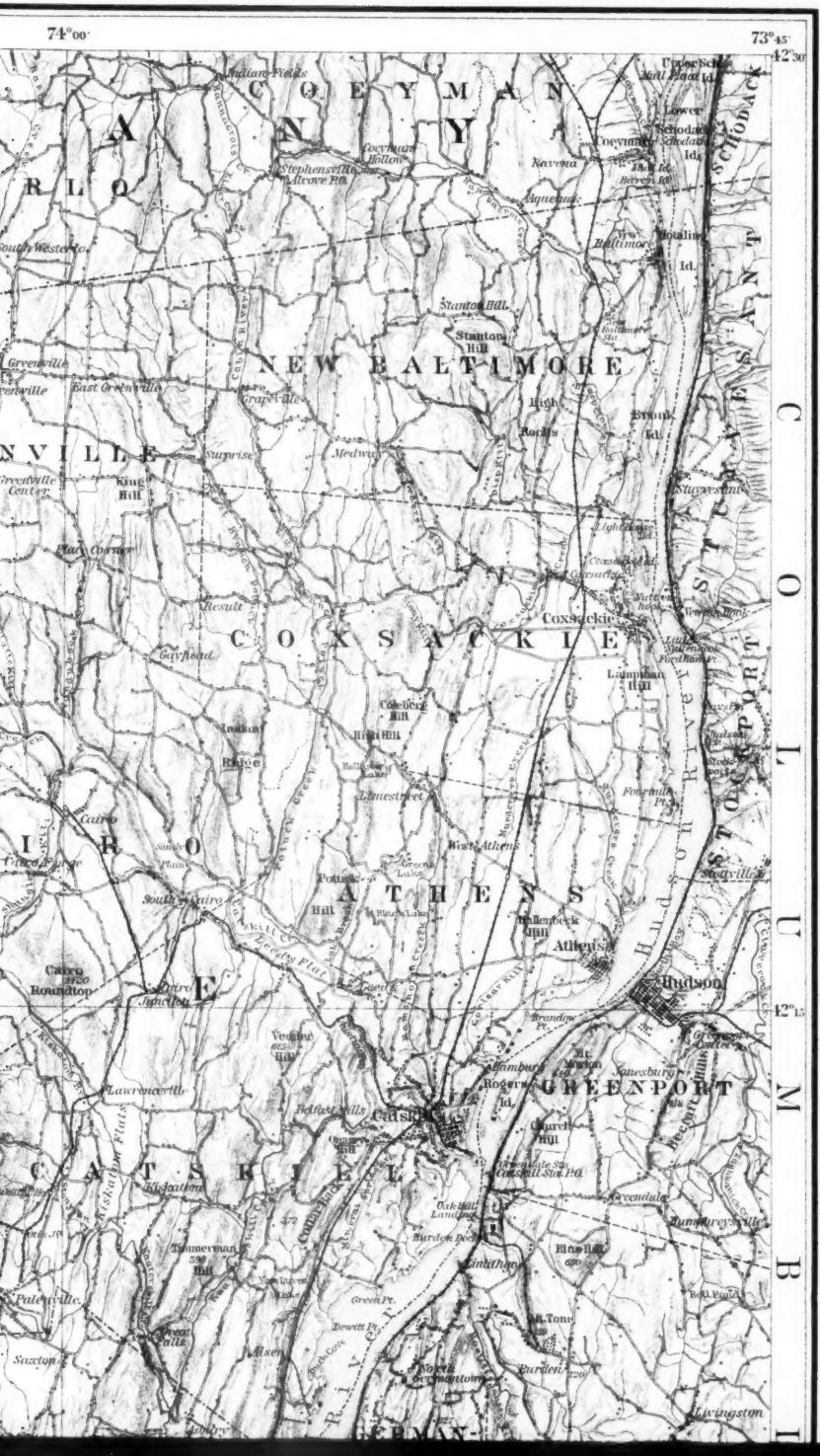
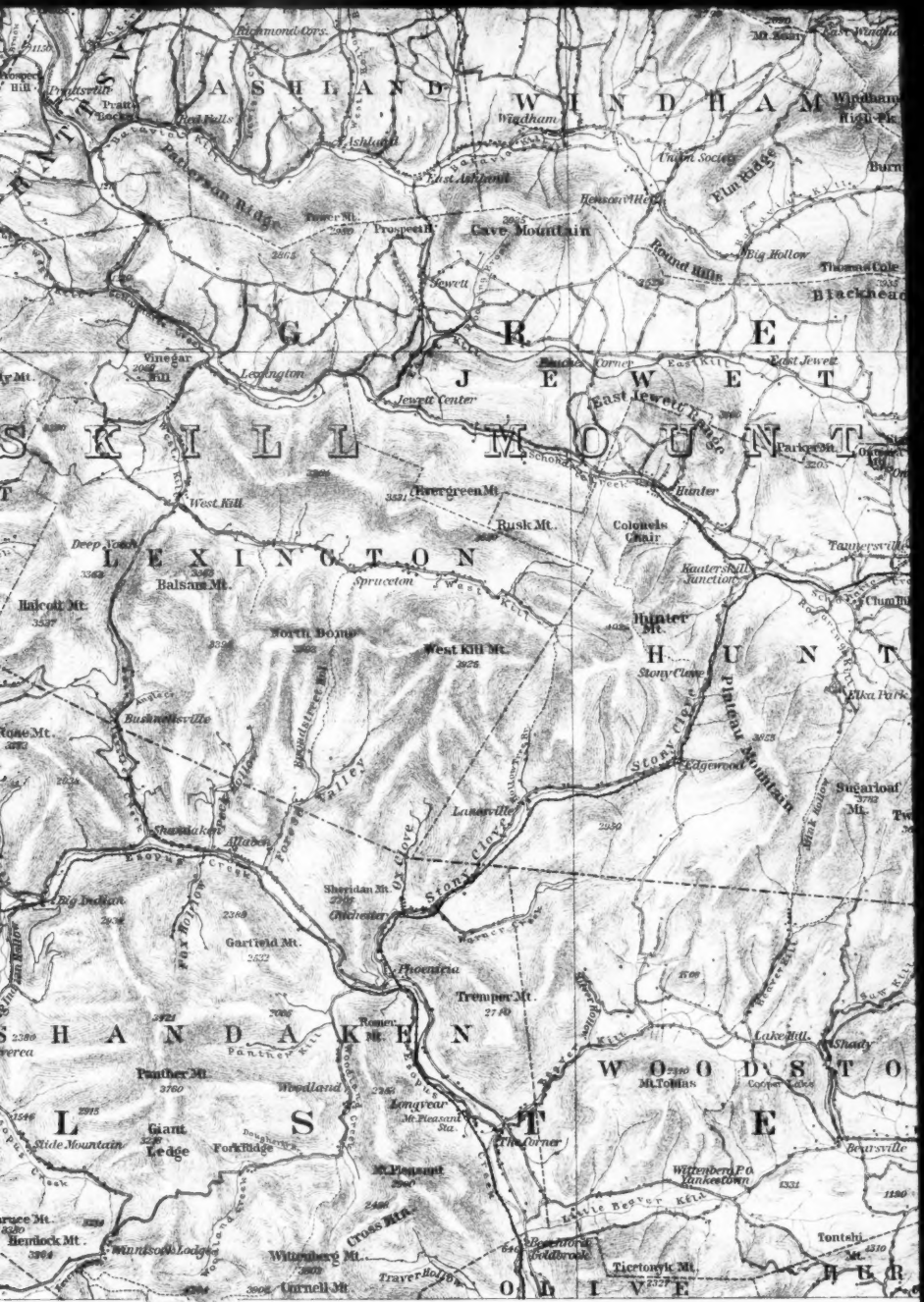
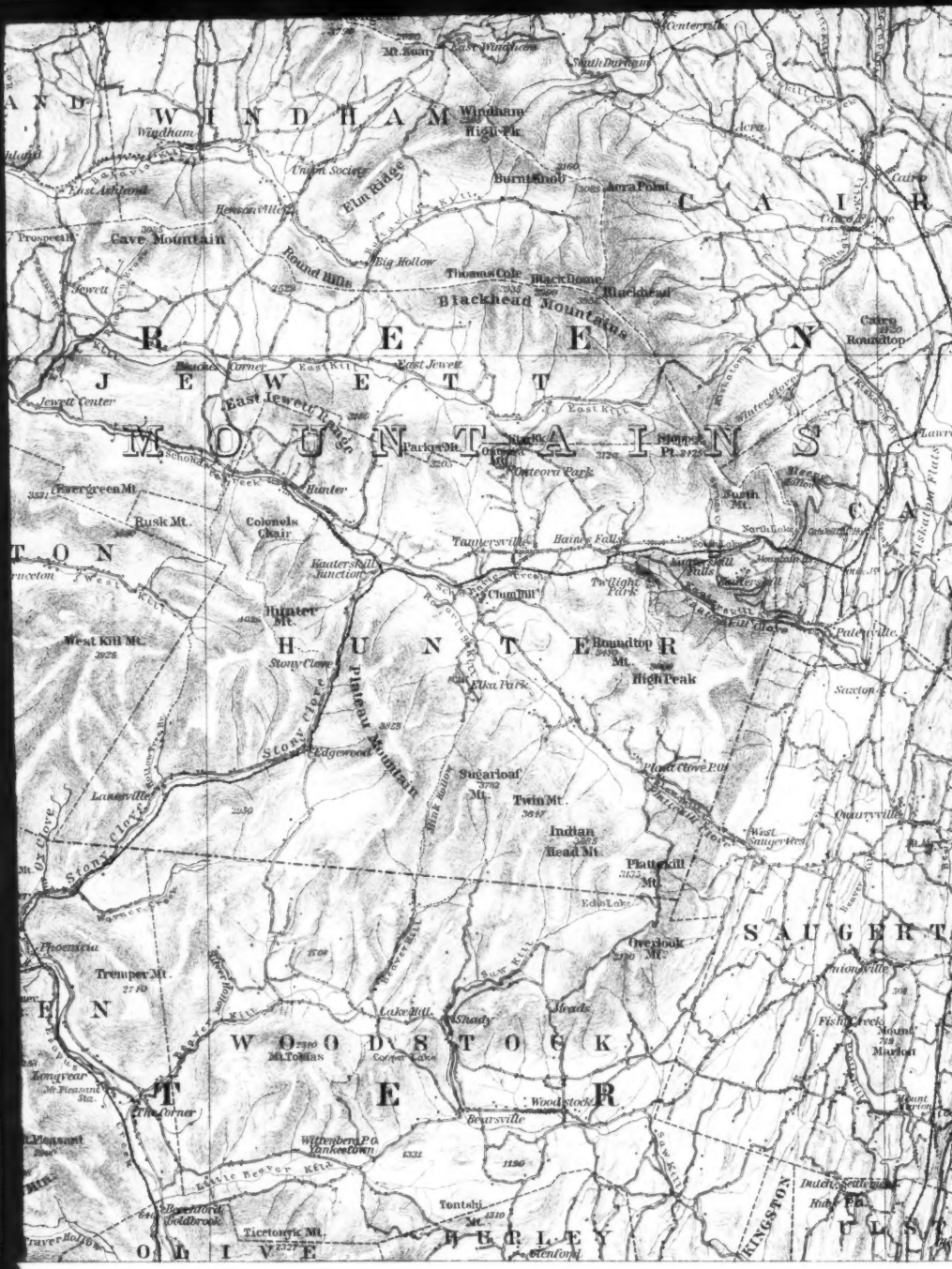
Stony Clove
Elka Park
Edgewood
Pisgah Mountain
Roundtop Mt.
High Peak
Palenville
Saxton


74°00'
73°45'
42°30'
42°15'
COEYMAN
ANY
RIO
NEW BALTIMORE
COXSACKIE
ATHENS
CATSKILL
GREENPORT
Hudson River
COLUMBIA
Coeymans
Coeymans Hollow
Stephensville
Kaveeta
Aquetuck
New Baltimore
Stanton Hill
Greenville
East Greenville
Craptville
Surprise
Medway
King Hill
Result
Coxsackie
Lammilan Hill
Cole Berg Hill
Indian Ridge
Lawrenceville
Potter Hill
West Athens
Athens
Hudson
Catskill
Leeds
Jonesburg
Church Hill
Cedar Hill
Oak Hill Landing
Elm Ridge
Limithico
Green Pt.
Dewett Pt.
Alsen
Livingston
Saugerties
Stuyvesant
Malden
Stockport
Middleburgh
Roundtop
Palenville
Saxton
Tannersville
Blue Hill
Rensselaer

Based on the Topographic Sheets of the U.S. Geological Survey



Longitude West 74°15′ of Greenwich


WINDHAM
Windham
Windham High Pk.
Mt. Zoar
East Windham
South Durham
Acra
Cairo
Union Society
Elm Ridge
Burnt Knob
Acra Point
East Ashland
Hensonville
Cave Mountain
Prospect
Big Hollow
Round Hills
Thomas Cole
Blackhouse
Blackhead
Blackhead Mountains
Jewett
Catskill Mountain House
Catskill Mtn. House
Catskill Mountain Ho.
Catskill Mountain
Catskill Mtn.
Catskill Mountain Ho.
Catskill Mtn. House
Catskill Mountain House
Catskill Mtn. House
Catskill Mountain House
Catskill Mtn. House
Catskill Mountain House

THE CATSKILL MOUNTAINS

Scale 1:190.080

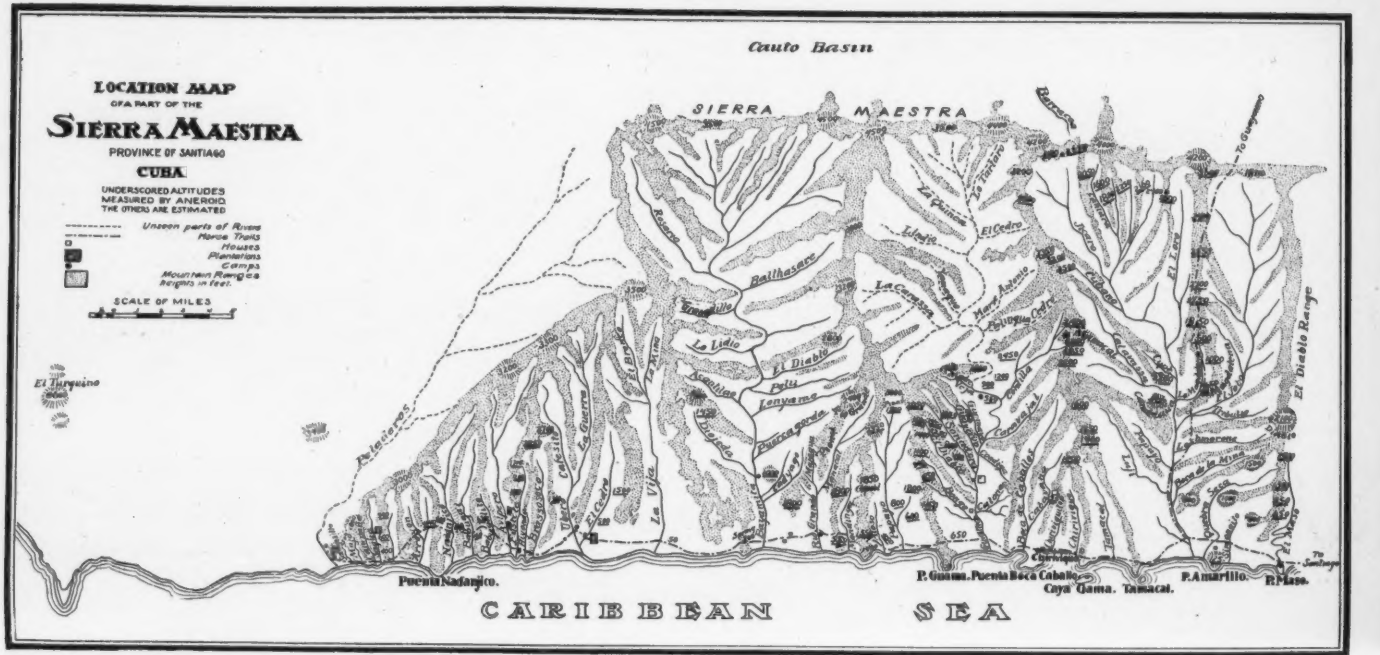
0 ½ 1 2 3 4 5 Miles

(3 miles = 1 inch)

Station — Railroad
Road
Private or secondary road
Trail
County line — Civil township line

42°00′
74°00′
73°45′

Wagner & Debes' Geogr. Establ. Leipsic



Drawn by B. E. Fernow, 1906.